Vol. 1114 Number 5

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GENERAL INFORMATION concerning TRADEMARKS.

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Printing authorized by Section 11(a)3 of Title 35, U.S. P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1109 O.G. 3 on Dec. 5, 1989.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 5 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988.

The search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar in relation to the German Mark as of March 1, 1990, and was announced in the *Official Gazette* at 1111 O.G. 24 on Feb. 20, 1990.

International PCT fees were changed on June 1, 1989 due to a difference in the exchange rate of the U.S. dollar in relaton to the Swiss Franc and were announced in the *Official Gazette* at 1102 O.G. 90 on May 30, 1989.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed	550.00
—Corresponding prior U.S. national application filed	380.00
—Supplemental search fee, per additional invention	150.00
European Patent Office as ISA	1242.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA.	400.00
—Additional examination fee, per additional invention	130.00
—ISA not the USPTO	600.00
—Additional examination fee, per additional invention	200.00
International fees	
Basic fee	436.00
Basic Supplemental fee (for each page over 30)	9.00
Designation fee per country or region for the first 10 national or regional offices	106.00
Designation fee for 11th and subsequent designations	No Charge
Handling fee	134.00

U.S. National Stage fees

	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA	185.00	370.00
USPTO was neither ISA nor IPEA	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	25.00	50.00
—For each independent claim in excess of 3	18.00	36.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT 1112 OG 2 Article 22 or 39(1)	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1)	30.00	30.00

Apr. 30, 1990

HARRY F. MANBECK, Jr.
Assistant Secretary and Commissioner of Patents and Trademarks.

Status of Appeal Cases

The Date of Examiner's Answer of Oldest Ex Parte Appeals Awaiting Assignment to Panel For A Decision Without a Hearing as of April 30, 1990.

Chemical Discipline -	July 12, 1989
Mechanical Discipline -	November 1, 1988
Electrical Discipline -	November 2, 1988

The Date of Examiner's Answer of Oldest Ex Parte Appeals Awaiting Hearing as of April 30, 1990.

Chemical -	November 1, 1988
*Electrical -	April 4, 1989
Mechanical -	March 2, 1989

Board of Patent Appeals and Interferences Decisions Rendered in Ex Parte Appeals During the Month of February1990.

Affirmed	219
Affirmed-in-Part	52
Reversed	150
Total Decided	421

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for

*Due to a clerical error the March 1990, report *incorrectly* indicated that the date of the Examiners Answer of oldest Ex Parte appeal in the Electrical discipline awaitng the setting of a hearing date was October 7, 1989. The correct date should have been January 5, 1989.

payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on May 26, 1987 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,667,343 through 4,669,124
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on May 24, 1983 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,384,369 through 4,385,402
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), (f), (h) and (i), as amended effective Apr. 17, 1989, which are reproduced below:

37 CFR § 1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant.....$245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant.....$495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)).....$245.00
By other than a small entity.....$490.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f)).....$495.00
By other than a small enttity.....$990.00"

The amounts of the surcharges as amended effective Apr. 17, 1989, are set forth in 37 CFR 1.20 (k), (l) and (m) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27,1982.....$120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f)).....$60.00
By other than a small entity.....$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.....$550.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED MARCH 18, 1990
DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,319,420	06/223,250	3/16/82
4,319,427	06/255,771	3/16/82
4,319,511	06/251,810	3/16/82
4,319,545	06/220,131	3/16/82
4,319,561	06/256,885	3/16/82
4,319,615	06/218,708	3/16/82
4,319,734	06/241,724	3/16/82
4,319,816	06/216,005	3/16/82
4,319,888	06/215,779	3/16/82
4,319,925	06/241,008	3/16/82
4,319,968	06/237,616	3/16/82
4,319,971	06/247,722	3/16/82
4,319,972	06/215,595	3/16/82
4,319,978	06/221,673	3/16/82
4,320,003	06/223,695	3/16/82
4,320,056	06/243,171	3/16/82
4,320,068	06/233,736	3/16/82
4,320,072	06/239,096	3/16/82
4,320,095	06/225,913	3/16/82
4,320,096	06/225,905	3/16/82
4,320,118	06/218,886	3/16/82
4,320,131	06/244,426	3/16/82
4,320,336	06/234,996	3/16/82
4,320,482	06/227,726	3/16/82
4,575,872	06/723,867	3/18/86
4,575,873	06/668,152	3/18/86
4,575,875	06/621,707	3/18/86
4,575,876	06/674,968	3/18/86
4,575,877	06/520,455	3/18/86
4,575,879	06/539,150	3/18/86
4,575,883	06/623,720	3/18/86
4,575,884	06/636,130	3/18/86
4,575,886	06/339,906	3/18/86
4,575,893	06/575,441	3/18/86
4,575,894	06/667,570	3/18/86
4,575,895	06/703,390	3/18/86
4,575,898	06/651,883	3/18/86
4,575,908	06/751,893	3/18/86
4,575,912	06/610,289	3/18/86
4,575,914	06/510,665	3/18/86
4,575,921	06/656,182	3/18/86
4,575,928	06/645,228	3/18/86
4,575,943	06/717,910	3/18/86
4,575,946	06/642,052	3/18/86
4,575,948	06/467,392	3/18/86
4,575,966	06/644,933	3/18/86
4,575,971	06/546,951	3/18/86
4,575,979	06/638,910	3/18/86
4,575,982	06/675,614	3/18/86
4,575,984	06/502,744	3/18/86
4,575,986	06/568,704	3/18/86
4,575,990	06/690,789	3/18/86
4,575,991	06/660,109	3/18/86
4,575,998	06/716,058	3/18/86
4,576,004	06/627,012	3/18/86
4,576,006	06/619,223	3/18/86
4,576,010	06/543,059	3/18/86

Patent Number	Serial Number	Issue Date
4,576,013	06/592,464	3/18/86
4,576,018	06/613,957	3/18/86
4,576,021	06/483,824	3/18/86
4,576,038	06/650,725	3/18/86
4,576,066	06/475,894	3/18/86
4,576,074	06/521,561	3/18/86
4,576,075	06/577,953	3/18/86
4,576,079	06/677,689	3/18/86
4,576,080	06/598,343	3/18/86
4,576,086	06/540,472	3/18/86
4,576,091	06/636,024	3/18/86
4,576,094	06/770,050	3/18/86
4,576,100	06/419,168	3/18/86
4,576,101	06/583,981	3/18/86
4,576,109	06/736,739	3/18/86
4,576,111	06/573,303	3/18/86
4,576,127	06/732,716	3/18/86
4,576,138	06/755,208	3/18/86
4,576,141	06/692,215	3/18/86
4,576,148	06/576,592	3/18/86
4,576,150	06/584,649	3/18/86
4,576,152	06/543,238	3/18/86
4,576,154	06/595,590	3/18/86
4,575,159	06/582,912	3/18/86
4,576,161	06/592,136	3/18/86
4,576,174	06/509,034	3/18/86
4,576,186	06/671,331	3/18/86
4,576,201	06/672,229	3/18/86
4,576,204	06/587,830	3/18/86
4,576,208	06/675,235	3/18/86
4,576,210	06/745,380	3/18/86
4,576,212	06/588,112	3/18/86
4,576,227	06/504,144	3/18/86
4,576,228	06/576,679	3/18/86
4,576,236	06/608,900	3/18/86
4,576,240	06/435,247	3/18/86
4,576,250	06/740,585	3/18/86
4,576,258	06/685,857	3/18/86
4,576,265	06/543,838	3/18/86
4,576,267	06/616,221	3/18/86
4,576,270	06/470,509	3/18/86
4,576,279	06/674,780	3/18/86
4,576,280	06/597,223	3/18/86
4,576,282	06/609,717	3/18/86
4,576,291	06/485,961	3/18/86
4,576,292	06/754,348	3/18/86
4,576,293	06/578,765	3/18/86
4,576,314	06/552,349	3/18/86
4,576,319	06/658,320	3/18/86
4,576,320	06/676,520	3/18/86
4,576,321	06/515,172	3/18/86
4,576,326	06/610,008	3/18/86
4,576,332	06/702,941	3/18/86
4,576,336	06/594,996	3/18/86
4,576,349	06/478,632	3/18/86
4,576,350	06/613,738	3/18/86
4,576,351	06/621,156	3/18/86
4,576,353	06/522,375	3/18/86
4,576,354	06/620,557	3/18/86
4,576,355	06/646,227	3/18/86
4,576,361	06/238,906	3/18/86
4,576,366	06/536,649	3/18/86
4,576,372	06/676,489	3/18/86
4,576,376	06/674,184	3/18/86
4,576,378	06/620,036	3/18/86
4,576,380	06/599,662	3/18/86
4,576,382	06/753,413	3/18/86
4,576,388	06/606,833	3/18/86
4,576,389	06/695,253	3/18/86
4,576,391	06/513,811	3/18/86
4,576,394	06/527,682	3/18/86
4,576,395	06/604,361	3/18/86
4,576,399	06/549,706	3/18/86
4,576,400	06/578,978	3/18/86
4,576,403	06/698,083	3/18/86
4,576,414	06/574,793	3/18/86
4,566,419	06/598,889	3/18/86
4,576,420	06/594,207	3/18/86
4,576,423	06/657,550	3/18/86
4,576,424	06/593,834	3/18/86
4,576,426	06/721,997	3/18/86
4,576,468	06/603,397	3/18/86
4,576,477	06/390,876	3/18/86
4,576,480	06/514,594	3/18/86
4,576,483	06/632,431	3/18/86
4,576,484	06/628,169	3/18/86
4,576,492	06/554,604	3/18/86
4,576,495	06/608,970	3/18/86
4,576,504	06/728,265	3/18/86
4,576,533	06/624,364	3/18/86
4,576,535	06/552,534	3/18/86
4,576,541	06/584,595	3/18/86
4,576,544	06/724,896	3/18/86
4,576,549	06/470,398	3/18/86
4,576,553	06/564,724	3/18/86
4,576,564	06/580,488	3/18/86
4,576,574	06/694,785	3/18/86
4,576,583	06/654,167	3/18/86
4,576,584	06/565,584	3/18/86
4,576,585	06/694,616	3/18/86
4,576,586	06/703,333	3/18/86
4,576,610	06/482,014	3/18/86
4,576,616	06/647,857	3/18/86
4,576,618	06/639,534	3/18/86
4,576,626	06/722,985	3/18/86
4,576,629	06/589,724	3/18/86
4,576,632	06/669,016	3/18/86
4,576,640	06/626,235	3/18/86
4,576,651	06/584,534	3/18/86
4,576,655	06/769,807	3/18/86
4,576,664	06/565,613	3/18/86
4,576,668	06/614,832	3/18/86
4,576,675	06/640,423	3/18/86
4,576,684	06/669,444	3/18/86
4,576,695	06/554,691	3/18/86
4,576,710	06/672,841	3/18/86
4,576,713	06/632,427	3/18/86
4,576,717	06/636,396	3/18/86
4,576,723	06/677,308	3/18/86
4,576,730	06/712,865	3/18/86
4,576,739	06/656,660	3/18/86
4,576,742	06/570,100	3/18/86
4,576,745	06/422,976	3/18/86
4,576,753	06/629,216	3/18/86
4,576,772	06/632,940	3/18/86
4,576,783	06/659,011	3/18/86
4,576,791	06/583,940	3/18/86
4,576,803	06/559,916	3/18/86
4,576,837	06/713,616	3/18/86
4,576,866	06/592,671	3/18/86
4,576,871	06/574,605	3/18/86
4,576,872	06/581,320	3/18/86
4,576,918	06/463,286	3/18/86
4,576,935	06/544,855	3/18/86
4,576,936	06/361,119	3/18/86
4,576,938	06/447,809	3/18/86
4,576,939	06/439,898	3/18/86
4,576,941	06/584,576	3/18/86
4,576,942	06/630,048	3/18/86
4,576,945	06/567,475	3/18/86
4,576,948	06/459,433	3/18/86
4,576,952	06/693,731	3/18/86
4,576,961	06/527,812	3/18/86
4,576,965	06/509,452	3/18/86
4,576,973	06/623,708	3/18/86
4,576,976	06/587,176	3/18/86
4,576,994	06/646,583	3/18/86
4,577,006	06/712,207	3/18/86
4,577,008	06/625,168	3/18/86
4,577,009	06/651,713	3/18/86
4,577,011	06/643,330	3/18/86
4,577,021	06/718,199	3/18/86
4,577,023	06/614,241	3/18/86
4,577,053	06/585,529	3/18/86
4,577,058	06/600,823	3/18/86
4,577,059	06/454,414	3/18/86

Patent Number	Serial Number	Issue Date
4,577,061	06/609,077	3/18/86
4,577,081	06/602,542	3/18/86
4,577,082	06/500,855	3/18/86
4,577,087	06/625,887	3/18/86
4,577,089	06/592,728	3/18/86
4,577,094	06/539,083	3/18/86
4,577,106	06/531,471	3/18/86
4,577,107	06/647,595	3/18/86
4,577,108	06/675,223	3/18/86
4,577,115	06/439,995	3/18/86
4,577,117	06/501,493	3/18/86
4,577,147	06/501,088	3/18/86
4,577,156	06/582,420	3/18/86
4,577,171	06/609,205	3/18/86
4,577,175	06/624,945	3/18/86
4,577,183	06/357,647	3/18/86
4,577,185	06/518,531	3/18/86
4,577,189	06/363,598	3/18/86
4,577,194	06/504,262	3/18/86
4,577,200	06/672,178	3/18/86
4,577,205	06/614,307	3/18/86
4,577,220	06/614,323	3/18/86
4,577,224	06/399,471	3/18/86
4,577,234	06/547,325	3/18/86
4,577,248	06/462,591	3/18/86
4,577,249	06/462,286	3/18/86
4,577,253	06/491,364	3/18/86
4,577,257	06/628,808	3/18/86
4,577,258	06/676,490	3/18/86
4,577,264	06/678,669	3/18/86
4,577,268	06/652,485	3/18/86
4,577,278	06/514,921	3/18/86
4,577,290	06/593,469	3/18/86
4,577,301	06/628,686	3/18/86
4,577,303	06/622,799	3/18/86
4,577,304	06/510,749	3/18/86
4,577,307	06/655,847	3/18/86
4,577,322	06/543,368	3/18/86
4,577,333	06/650,777	3/18/86
4,577,336	06/736,401	3/18/86
4,577,339	06/546,615	3/18/86

NOTIFICATION OF ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEE (35 U.S.C. 41(c); 37 CFR 1.378)

The patent(s) listed below are considered as not having expired but are subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fees which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1) and 37 CFR 1.378.

Patent No.	Serial No.	Patent Date	Application Filing Date	Delayed Payment Acceptance Date
4,384,716	06/231,874	5/24/83	2/05/81	4/26/90
4,494,229	06/331,383	1/15/85	12/16/81	4/17/90
4,509,694	06/499,983	4/09/85	6/01/83	4/17/90

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,883,634, Re. S. N. 07/485,902, Filed Feb. 26, 1990, Cl. 423/87, LIQUID-LIQUID EXTRACTION OF GERMANIUM FROM AQUEROUS SOLUTION USING HYDROXY-OXIMES, Archille de Schepper, et al., Owner of Record: *Metallurgie Hoboken-Overpelt, Brussels, Belgium,* Attorney or Agent: Berj A. Terzian, Ex. Gp.: 113

4,596,743, Re. S. N. 07/512,310, Filed Apr. 20, 1990, Cl. 428/380, GREASE COMPATIBLE EXTENDED POLYURETHANES, Melvin Brauer, et al., Owner of Record: *Caschem Inc. Bayonne, New Jersey,* Attorney or Agent: Stanton T. Lawrence, Ex. Gp.: 154

4,704,792, Re. S. N. 07/435,164, Filed Nov. 13, 1989, Cl. 29/741, COMPONENTS FEEDING APPARATUS, Masato Itagki, et al., Owner of Record: *Hitachi, Ltd., Tokyo, Japan,* Attorney or Agent: Ronald J. Shore, Ex. Gp.: 326

4,738,145, Re. S. N. 07/510,539, Filed Apr. 17, 1990, Cl. 73/862.23, MONITORING TORQUE IN TUBULAR GOODS, Darrell L. Vincent, et al., Owner of Record: *Inventor,* Attorney or Agent: Ned L. Conley, Ex. Gp.: 268

4,738,206, Re. S. N. 07/510,975, Filed Apr. 19, 1990, Cl. 110/346, APPARATUS AND METHOD FOR LOW TEMPERATURE THERMAL STRIPPING OF VOLATILE ORGANIC COMPOUNDS FROM SOIL, John W. Noland, Owner of Record: *Roy F. Weston, Inc., West Chester, Pa,* Attorney or Agent: Austin R. Miller, Ex. Gp.: 344

4,765,979, Re. S. N. 07/511,205, Filed Apr. 19, 1990, Cl. 424/84, METHOD AND COMPOSITON FOR KILLING TERESTRIAL MOLLUSCS, James W. Neilsen, Owner of Record: *Micro Flo Co., Mulber, Fla.,* Attorney or Agent: Lance G. Johnson, Ex. Gp.: 125

4,773,422, Re. S. N. 07/513,421, Filed Apr. 10, 1990, Cl. 128/633, PULSE OXIMETER WITH CIRCUIT LEAKAGE AND AMBIENT LIGHT COMPENSATION, Philip O. Isaacson, et al., Owner of Record: *Nonin Medical, Inc., Plymouth, Minn.,* Attorney or Agent: Thomas J. Nikolai, Ex. Gp.: 335

4,785,619, Re. S. N. 07/495,995, Filed Mar. 20, 1990, Cl. 57/313, APPARATUS FOR PRODUCING A STAPLE FIBER YARN, Fritz Stahlecker, et al., Owner of Record: *Inventor,* Attorney or Agent: Donald D. Evenson, Ex. Gp.: 245

4,789,132, Re. S. N. 07/513,437, Filed Apr. 23, 1990, Cl. 251/129, VALVE, Yuichi Fujita, et al., Owner of Record: *Toyo Engineering Corp., Tokyo, Japan,* Attorney or Agent: L. Martin Flynn, Ex. Gp.: 347

4,865,024, Re. S. N. 07/444,782, Filed Dec. 1, 1989, Cl. 128/80, EXTENSION DECELERATION ORTHOSIS, David E. Hensley, et al., Owner of Record: *Inventor,* Attorney or Agent: Richard D. Multer, Ex. Gp.: 337

4,865,775, Re. S. N. 07/510,585, Filed Apr. 18, 1990, Cl. 261/24, HUMIDIFIER WITH FLOATING WICK ASSEMBLY, Robert E. Steiner, Owner of Record: *Emerson Electric Co., St. Louis, Mo.,* Attorney or Agent: Michael Kovac, Ex. Gp.: 135

4,878,353, Re. S. N. 07/507,883, Filed Apr. 12, 1990, Cl. 62/521, CHAMBER AND PROCESS FOR THERMAL TREATMENT COMPRISING A COOLING PHASE, Claude Gibot, et al., Owner of Record: *Carboxyque Francaise Societe Nouvelle des Etablissements, Montelimar, France,* Attorney or Agent: R. J. Patch, Ex. Gp.: 344

4,892,825, Re. S. N. 07/512,823, Filed Apr. 23, 1990, Cl. 435/180, IMMOBILIZTION OF BIOLOGICALLY ACTIVE MA-

TERIAL WITH GLUTARALDEHYDE AND POLYAZETIDINE, Mogens Wumpelmann, et al., Owner of Record: *Novo Industri A/S, Bagvaerd, Denmark*, Attorney or Agent: Morris Fidelman, Ex. Gp.: 182

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

4,079,028, Reexam. No. 90/001,995, Requested Apr. 10, 1990, Cl. 524/507, POLYURETHANE THICKNERS IN LATEX COMPOSITIONS, W. D. Emmons, et al., Owner of Record: *Rohm & Haas Co., Philadelphia, Pa.*, Attorney or Agent: Michael Fein, Ex. Gp.: 150, Requester: Burns, Doane, Swecker & Mathis, Alexandria, Va.

4,189,551, Reexam. No. 90/001,990, Requested Mar. 29, 1990, Cl. 526/74 PROCESS FOR REDUCING ADHESIONS DURING SUSPENSION POLYMERIZATION, Subhash V. Gangal, Owner of Record: *E. I. du Pont de Nemours & Co., Wilmington, Del.*, Attorney or Agent: Unknown, Ex. Gp.: 150, Requester: Owner

4,193,499, Reexam. No. 90/001,996, Requested Apr. 11, 1990, Cl. 206/254, PREFABRICATED UNITARY PACKAGE WHICH WHEN SEALED AND IRRADIATED CONFORMS CLOSELY TO CONTENTS AND BECOMES IMPACT-ABSORBING, Thedore W. Lookholder, Owner of Record: *Sealed Air Corp., New York, N.Y.*, Attorney or Agent: Robert L. Finkel, Ex. Gp.: 240, Requester: 3M Co., St. Paul, Minn.

4,221,483, Reexam. No. 90/001,994, Requested Apr. 10, 1990, Cl. 356/250, LASER BEAM LEVEL INSTRUMENT, Joseph F. Rando, Owner of Record: *Spectra-Physics, Inc., Mountain View, Calif.*, Attorney or Agent: Unknown, Ex. Gp.: 250, Requester: CLS Laser Systems, Inc., Los Angeles, Calif.

4,620,633, Reexam. No. 90/001,997, Requested Apr. 11, 1990, Cl. 206/523, PROTECTIVE ENVELOPE DEVICE FOR PACKAGING FRAGILE ARTICLES, Thedore W. Lookholder, Owner of Record: *Inventor*, Attorney or Agent: Robert L. Finkel, Ex. Gp.: 240, Requester: 3M Co., St. Paul, Minn.

4,742,142, Reexam. No. 90/001,991, Requested Apr. 9, 1990, Cl. 528/15, METHOD FOR PRODUCING SILICONE RUBBER POWDER, Koji Shimizu, et al., Owner of Record: *Toray Silicone Co., Tokyo, Japan*, Attorney or Agent: Robert Spector, Ex. Gp.: 150, Requester: Owner

4,773,812, Reexam. No. 90/001,993, Requested Apr. 10, 1990, Cl. 414/408, RECEPTACLE LIFT AND SLIM PROFILE POWER UNIT THEREFOR, Jimmy O. Bayne, et al., Owner of Record: *Bayne Machine Works, Inc., Simpsonville, S.C.*, Attorney or Agent: Dority & Manning, Ex. Gp.: 310, Requester: Owner

4,812,544, Reexam. No. 90/001,989, Requested Apr. 9, 1990, Cl. 526/73, METHOD OF PRODUCING POLYMERS OF AMIDOSULFONIC ACID MONOMERS WITH HIGH ENERGY AGITATORS, Thomas M. Sopko, et al., Owner of Record: *The Lubrizol Corp., Wickliffe, Ohio*, Attorney or Agent: Unknown, Ex. Gp.: 150, Requester: Owner

4,882,120, Reexam. No. 90/001,992, Requested Apr. 11, 1990, Cl. 363/98, DC CONTENT CONTROL FOR AN INVERTER, Derrick I. Roe, et al., Owner of Record: *Sunstrand Corp., Rockford, Ill.*, Attorney or Agent: William E. McCracken, Ex. Gp.: 210, Requester: Owner

4,913,396, Reexam. No. 90/001,998, Requested Apr. 12, 1990, Cl. 248/649, ADJUSTABLE INCLINE SYSTEM FOR EXERCISE EQUIPMENT, William T. Dalebout, et al., Owner of Record: *Weslo Inc., Logan, Utah*, Attorney or Agent: Trask, Britt & Rosa, Ex. Gp.: 350, Requester: Owner

Service by Publication

A petition to cancel each of the registrations identified below having been filed, and the notice of such proceedings sent by certified mail to registrant at the last known adress having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrant listed herein, their assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Computerose, Inc., Arlington, Tex., Reg. No. 1,345,779, for the mark "COMPUTEROSE", Canc. No. 18,453.

Spare Parts, Los Angeles, Calif., Reg. No. 1,096,817, for the mark "SPARE PARTS", Canc. No. 18,519.

Wilbert Products Co., Inc., Bronx, N.Y., Reg. No. 652,519, for the mark "FRESH PINE", Canc. No. 17,711.

Net Cost Club, Inc., Montgomeryville, Pa., Reg. No. 1,463,143, for the mark "N.C.C.", Canc. No. 18,415.

BEI Restaurants of Albany, Inc., Wappingers Falls, N.Y., Reg. No. 1,327,558, for the mark "PAPA RAZZI" and design, Canc. No. 18,491.

JEAN BROWN
Administrator of the
Trademark Trial and
Appeal Board
For JEFFREY M. SAMUELS
Assistant Commissioner for
Trademarks

Registration to Practice

The following list contains the names of persons applying for registration to practice before the United States Patent and Trademark Office. Final approval for registration is subject to establishing to the satisfaction of the Director of the Office of Enrollment and Discipline that the person seeking registration is of good moral character and repute. [37 CFR 10.7(a)]. Accordingly, any information tending to affect the eligibility of any of the following applicants on moral, ethical, or other grounds should be furnished the Director, Office of Enrollment and Discipline on or before June 22, 1990.

Hoch, Ramon R., 3004 Mt. Vernon Ave., Alexandria, Va., 22305
Hochenshell, Jeffrey J., 291 W. 7th St., #811, St. Paul, Minn., 55102
Jordan, Mervin L., 6636 S. Kings Hwy., Alexandria, Va., 22306
Peterson, Christine A., 14226 E. First Dr., #B-4, Aurora, Colo., 80011
Sloyan, Thomas J., 1600 S. Eads St., #629N, Arlington, Va., 22202
Sykes, Angela D., 5140 Woodford Dr., Centreville, Va., 22202

CAMERON WEIFFENBACH, *Director*
Office of Enrollment and Discipline

NOTICE OF EXAMINATION FOR REGISTRATION WEDNESDAY, OCTOBER 10, 1990

Pusuant to the provisions of 37 CFR §§ 10.5, 10.6 and 10.7, an examination for persons seeking registration before the United States Patent and Trademark Office as patent attorneys and agents will be held on *Wednesday, October 10, 1990*. The

deadline for filing applications along with the $270.00 examination fee and *all* necessary showings required by 37 CFR §§ 10.7(a) and (b) is *July 31, 1990*.

With the exception of those persons who actively served four years or more in the examining corps of the United States Patent and Trademark Office for whom the examination may be waived, all persons who wish to become recognized to practice before the United States Patent and Trademark Office in patent cases must, pursuant to the above noted rules, pass the examination. Note that passing the examination does not qualify one for recognition for practice before the Patent and Trademark Office in trademark cases. Such recognition is governed by 37 CFR § 10.14 which does not require the passing of an examination.

There is no limit on the number of times the registration examination may be taken. The examination consists of two parts, a morning section and an afternoon section. To pass the examination, an applicant must pass both sections. An applicant who passes one section of the examination, but who fails the other section, willl not be required to retake the section passed, *provided* the applicant takes and passes the section failed in one of the next three examinations regularly scheduled by the Patent and Trademark Office. If the applicant does not pass the the section failed in one of the next three examinations scheduled, the applicant must retake both sections of the examination. No extensions of time will be granted except in extraordinary circumstancees, e.g., an accident or hospitalization just prior to the examination which prevented the applicant from taking the examination.

Application forms may be obtained from the Office of Enrollment and Discipline, Suite 810, Crystal Park One, 2011 Crystal Park Drive, Arlington, Va., or by mail addressed to U.S. Patent and Trademark Office, Box OED, Washington, D.C. 20231.

April 27, 1990 CAMERON WEIFFENBACH, *Director*
Office of Enrollment and Discipline

Registration to Practice

The following list contains the names of persons who sucessfully passed the examination for registration to practice before the United States Patent and Trademark Office held on October 11, 1989. These persons have been given provisional recognition pursuant to 37 CFR 10.9(a) to prepare and prosecute patent applications before the Office until their registraion certificates are mailed to them. Final approval for registraion is subject to establishing to the satisfaction of the Director of the Office of Enrollment and Discipline that the person seeking registration is of good moral character and repute. 37 CFR 10.7(a). Accordingly, any information tending to affect the eligiblity of any of the following persons on moral, ethical or other grounds should be furnished to the Director of Enrollment and Discipline on or before July 20, 1990. Send information to be considered to the following address: U.S. Patent and Trademark Office, Box OED, Washington, D.C. 20231.

Agris, Cheryl H., 500 E. 63rd St., #14K, New York, N.Y. 10021
Appollina, Mary A., 41 Almond Dr., Somerset, N.J. 08873
Billi, Ron, 165 N. 5th St., #202, Port Hueneme, Calif. 93041
Blackman, Scott H., 60 West 66th St., #7F, New York, N.Y. 10023
Chen, Fu, 19 Meadow View Dr., Newtown, Pa. 18940
Ching, Edwin P., 1070 Mercedes Crt., #16, Los Altos, Calif. 94022
Conser, Richard E., 24 Briar Rd., Box 206, Golf, Ill. 60029
Kantor, Sharon R., 893 Richard La., Danville, Calif. 94526
Leitereg, Elizabeth E., 3136 Park Estates Way, San Jose, Calif. 95135
Mazza, Michael P.,351 Bryant, Glen Ellyn, Ill. 60137
Messnick, Richard C., 9174B Breeds Hill La., St. Louis, Mo. 62123
Molberg, Dale W., 449 Tyrella Ave., #39, Mountain View, Calif. 94043
Pappas, Lia M., 1248 Old Meadow Rd., Pittsburg, Pa. 15241
Patashnick, Kent I., 32 Marion Ave., North Adams, Mass. 01247
Patterson, William B., 902 Shelterwood Dr., Houston, Tex. 77008
Pisner, Gary S., 9621 Lindenbrook St., Fairfax, Va. 22031
Pollack, Grant E., 48 Ferris Pl., Ossing, N.Y. 10562
Robitaille, Denis A., 383 Lexington St., Newton, Mass. 02166
Timiam, Susan J., 49-51 Fresh Meadow La., Fresh Meadows, N.Y. 11365

April 27, 1990 CAMERON WEIFFENBACH, *Director*
Office of Enrollment and Discipline

PRACTICE BEFORE THE PATENT AND TRADEMARK OFFICE -GOVERNMENT EMPLOYEES

On October 4, 1988, the Federal Register contained a notice removing section 10.6(d) of Title 37 of the Code of Federal Regulations. 53 Fed. Reg. 38,948, October 4, 1988. A decision in the U.S. District Court for the District of Columbia held that paragraph (d) was invalid to the extent that it precluded registration of an otherwise qualified individual solely on the basis of his or her status as a U.S. Government employee. *Athridge v. Quigg*, 655 F. Supp 779, 3 USPQ2d 1391 (D.D.C. 1987).

Under section 10.6(d), registered patent practitioners who were disqualified by statute from practicing as an attorney or agent in patent proceedings or other matters before Government departments or agencies were endorsed on the register as "inactive." By removing section 10.6(d), U.S. Government employees, not employed by the U.S. Patent and Trademark Office, may now be registered as "active" on the register irrespective of their official duties. *In re Atheridge*, 4 USPQ2d 1656 (Comm'r Pat. 1987).

The Office of Enrollement and Discipline (OED) has compiled the names and addresses of registered patent attorneys and agents, not employees of the U.S. Patent and Trademark Office, who are currently endorsed as "inactive" on the register. On November 30, 1989, a letter was sent to the each of these individuals at the last address furnished to OED informing them that they may change their status to "active."

The following individuals have not responded to the letter.

Morris M. Abrams, National Highway Traffic Safety Admin., Nassif Bldg.,, 400 7th St., S.W., Washington, D.C. 20590
Paul T. Allen, Jr., U.S. Army Legal Services, 5611 Columbia Pike, Falls Church, Va. 22041
Robert F. Allnutt, Commission on Government Procurement, 1717 H St., N.W., Washington, D.C. 20006
Robert P. Auber, U.S. Dept. of Commerce, NTIS, P.O. Box 1423, Springfield, Va. 22151
Morton W. Bachrach, U.S. Dept. of Health, Education & Welfare, Office of Education, 400 Maryland Ave., S.W., Washington, D.C. 20202
Walter R. Beam, U.S. Air Force, Office of the Secretary, Pentagon 4D961, Washington, D.C. 20330
Charles B. Brown, U.S. Dept. of Health, Education & Welfare, HEW Bldg., 300 Independence Ave., S.W., Washington, D.C. 20040
Herbert H. Brown, U.S. Air Force, Wright-Patterson Airforce Base. Base B Bldg. 11, Springfield St., Dayton, Ohio 45406
Allan R. Burke, U.S. Dept. of Transportation, 400 7th St., S.W., Washington, D.C. 20590
D. Robert Cervera, U.S. Securities & Exchange Comm., 150 Causeway St., Boston, Mass. 02114
Edward G. Conroy, U.S. Economic Dev. Admin., 14th & Constitutioin Ave., N.W., Washington, D.C. 20230
Susan M. Cooke, U.S. Environmental Protection Agency, Region 1, J.F. Kennedy Fed. Bldg., Boston, Mass. 02203
Jack C. Davis, U.S. Congressman William L. Scott, 1217 Longworth Bldg., Washington, D.C. 20515
Richard B. Dence, 4638 Gettyburg Dr., Sylvania, Ohio 43560
Nelson J. Edge, Defense Mapping Agency Topographic Center, 6500 Brookes La., Washington, D.C. 20315
John B. Farmakides, U.S. Dept. of Energy, Washington, D.C. 20545
James R. Fisher, U. S. Dept. of Labor-LMSA, Federal Bldg., Room 630, 231 W. Lafayette, Detroit, Mich. 48226
Steven J. Glassman, U.S. Attorney's Office, U.S. Courthouse, Foley Square, New York, N.Y. 10007
Leah K. Hendriksen, U.S. Environmental Protection Agency, S. Agriculture Bldg., Washington, D.C. 20460
James C. Herlihy, U.S. Environmental Protection Agency, 401 M St., S.W., Washington, D.C. 20460

M. Frank. Hersman, U.S. National Science Foundation, 1800 G St., N.W., Washington, D.C. 20040
Kevin J. Kelley, U.S. Naval Ocean Systems Center, 271 Catalina Blvd., San Diego, Calif. 92152
Arthur E. Korkosz, U.S. Attorney's Office, 3rd & Constitution, N.W., Washington, D.C. 20510
Eugene R. LaRoche, U.S. Navy, Off. of Naval Res., Ballston Tower #1, 800 N. Quincy St., Arlington, Va. 22217
Norman J. Latker, U.S. Dept. of Commerce, Off. of Govt. Pat. Policy, 14th & Constituition Ave., N.W., Washington, D.C. 20231
Arthur L. Levine, U.S. Dept. of Commerce, Econ. Dev. Admin., 14th & Constitution Ave., N.W., Washington, D.C. 20231
Thomas J. Madden. U.S. Dept. of Justice, Law Enforcement Admin., 633 Indiana Ave., N.W., Washington, D.C. 20530
Curtis W. McBride, U.S. Air Force, Off. of Staff Judge Advocate, Procurement Law Div.., Elgin AFB, Fla. 32542
Carl D. McManamy, U.S. Dept. of Justice, HOLC Bldg., 101 Indiana Ave., N.W., Washington, D. C. 20530
William T. Mefford, U.S. Navy, Norfolk Naval Base, Bldg. N-26, Norfolk, Va. 23511
John C. Morris, U.S. Air Force, Forrestal Bldg., Washington, D.C. 20314
Joseph J. Natoli, U.S. Atomic Energy Comm., 7920 Norfolk Ave., Bethesda, Md. 20014
George M. Paddack, U. S. Dept. of Justice, HOLC Bldg, 101 Indiana Ave., N.W., Washington, D.C. 20530
Ottis R. Pannell, U.S. Army, MERADCOM, Energy & Water Lab., Ft. Belvoir, Va. 22060
Irwin M. Pikus, U.S. Dept. of State, Bur. of Oceans & Internatl. Environmental & Scientific Affairs, Washington, D.C. 20520
James Renjilian, U.S. Securities & Exchange Comm., Washington, D.C. 20540
Frank W. Rose, U.S. Navy, Off. of Naval Res., Arlington, Va. 22217
Joseph F. Rosenthal, U.S. Federal Trade Comm., Washington, D.C. 20580
Frederick T. Sadler, U.S. Navy, Naval Air Systems Comm., Code: AIR 09B2, Washington, D.C. 20360
James E. Sak, U.S. Veterans Hospital, 800 Poly Place, Brooklyn, N.Y. 11209
David J. Schwartz, 2012 Hampstead Dr., Pittsburgh, Pa. 15235
Ralph W. Siskind, U.S. Mint, 5th & Arch Sts., Philadelphia, Pa. 19106
Edward M. Steutermann, U.S. Justice, 9010 Lakeridge Dr., Valley Station, Ky. 40272
Mollie Strum, U.S. Dept. of Justice, 201 Varick St., New York, N.Y. 10014
Gary Tabak, U.S. House of Representatives Banking & Currency Comm., Rayburn Bldg., Washington, D.C. 20515
Mardi R. Thompson, U.S. FAA, Philadelphia, Pa. 19076
John D. White, U.S. Dept. of Housing & Urban Dev., HPMC - Rm. 111, 1371 Peachtree St., N.E. , Atlanta, Ga. 30309
John J. White, CIA, 2430 E St., N.W., Washington, D.C. 20205
Jacob Ziegler, U.S. Dept. of Army, Edgewood Arsenal, Edgewood Arsenal, Md. 21010

The letter included a Data Sheet which was to be completed and returned to the Office of Enrollment and Discipline by Feb. 28, 1990. If your name appears in the listing above and you did not reeeive a letter from the Office of Enrollment and Discipline, please contact Patricia M. Jordan as soon as possible at (703) 557-2012.

Apr. 11, 1990 CAMERON WEIFFENBACH, *Director*
Office of Enrollment and Discipline

Status of PTO Services

The following is an update of the status of PTO services for April 1990

Service Item	FY 1990 Goal (Calendar Days)*	Monthly Average (Calendar Days)*
Filing Receipts:		
Patents	22	16
Trademarks	30	47
Patent/Trademark Copies:		
Special Window Coupons	24 Hours	17 Hours
Window Coupons	5	4
Mail Coupons	12	7
Letter Orders	16	17
Electronic Ordering Service (EOS)	11	6
Certified Copies:		
Trademark Registrations	21	12
Applications-As-Filed	17	12
File-Wrapper/Contents	N/A	16
Walk-up Certification	1	1
Patent Application Expedited	5	7
Trademark Search Library:		
Filing Pending Marks	23	51
Filing Reg. Certificates	Issue Date+2 days	+1 Days
Filing Temp. Drawings	8	19
Assignments:		
Recording Patent-New Applications	43	34
Recording Patent-Mail Room Recpts.	20	28
Receipt Date of Bulk Pat. Docs. Returned by End of Month		Mar. 16-Mar. 21, 1990
Recording Trademarks	20	30
Receipt Date of Bulk Trademarks Documents Returned by end of Month		Mar. 16-Mar. 23, 1990
Avg. Days from Issue Fee Payment to Issue Date	90-100	107
Issue Fee Receipts Mailed	4 weeks prior to Issue Date	On Time
Patent Copies Available	95% on Issue Date	+18 Days
Trademark Copies Available	95% on Issue Date	99% on Issue Date

* Unless otherwise noted.

IMPROVEMENT TO SERVICES

•*New File Ordering Service Introduced*•Members of the public can avoid standing in line to order patent files and instead can place orders using two computer terminals which have been installed in the Patent Search Room. The terminals are located next to the windows on the east side of the north stack area near the mezzanie elevator.

These terminals have been made available so that requesters may determine the location of files for *issued patents* and to place orders for them. Files ordered via the terminals may be picked up from the Files Information Unit (CP3-1D01A) in the usual manner. Instructions for using the terminals are posted at each terminal.

HELPFUL HINTS

Here are some helpful hints for facilitating the assignment recordation process:

1. Each assignment should be submitted with a cover letter. This cover letter should include, at a minimum:

   - application, patent or registration number of the application, patent or registration being transferred;
   - name of the party transferring the application, patent, or registration and to whom it is being transferred;
   - brief description of what the document intends to accomplish (such as an assignment, a security agreement, or a license);
   - total fee submitted or to be charged to a deposit account (at $8 per application, patent and registration being transferred) and the deposit account number. Avoid statements such as "Please charge the appropriate amount to my deposit account." However, you may authorize any additional fees to be charged to the deposit account to avoid receiving a non-recordation notice for insufficient fees.
   - address to which the document should be returned after it is recorded by the PTO.

Cover letters should be formatted for easy reading.

2. Each assignment should be accompanied by a separate cover letter. More than one application, patent, or registration can be identified in an assignment.

3. If an assignment is submitted with a new application, send two separate cover letters - one for the application and one for the assignment.

4. Assignment documents which transfer an interest in both patent and trademark matters are first processed through the automated patent assignment recordation system and then through the manual trademark assignment recordation system. This sequential processing causes a delay in returning these assignment documents. To avoid a delay, submit separate assignment documents, one for patent matters and one for trademark matters, each with its own cover letter.

5. All assignments should be submitted on bond weight paper that is no larger than 8 1/2" x 14". Only the front side of each sheet should be used, and a one inch margin should be left on all sides of each sheet of paper.

6. Assignments filed with new applications are stamped with the application number. Assignments of new applications not filed concurrently with the application should be held until the application number can be provided in the cover letter.

7. All assignments should be mailed to BOX ASSIGNMENTS unless they are filed concurrently with a new application.

8. Requests for assignment services (recordation, abstracts, certified copies) should be carefully proofread to ensure document numbers and addresses are correct.

SERVICE STATISTICS DEFINITIONS

The number of days to record patent and trademark assignments that is presented in the Service Statistics portion of the Official Gazette represents the time the majority of assignments are being recorded (mode). Some assignment documents will take a shorter or longer time. The two week date range for returning documents stated in Service Statistics represents the majority of documents being mailed on the last work day of the reporting period. Once again, this date is not absolute.

May 4, 1990

THERESA A. BRELSFORD
Assistant Commissioner
for Administration

PATENT NOTICES

Certificates of Correction For Week of May 29, 1990

D. 306,866	4,817,375	4,840,059	4,850,149
4,668,784	4,817,582	4,840,102	4,850,283
4,672,676	4,818,681	4,840,444	4,850,420
4,681,693	4,818,748	4,840,769	4,851,132
4,682,364	4,818,797	4,841,009	4,851,248
4,697,926	4,820,288	4,841,906	4,851,280
4,703,996	4,821,303	4,842,124	4,851,463
4,729,690	4,821,522	4,842,164	4,851,752
4,733,400	4,821,728	4,842,893	4,852,179
4,739,320	4,823,533	4,843,157	4,852,242
4,747,701	4,823,981	4,843,196	4,852,291
4,752,245	4,824,351	4,843,206	4,852,323
4,760,280	4,826,113	4,843,226	4,852,603
4,763,769	4,826,661	4,843,413	4,852,607
4,764,412	4,827,173	4,843,600	4,852,840
4,768,646	4,827,500	4,844,066	4,852,896
4,769,698	4,827,924	4,844,229	4,852,990
4,779,179	4,829,895	4,844,382	4,853,169
4,783,514	4,830,450	4,844,801	4,853,298
4,785,192	4,830,563	4,845,095	4,853,445
4,785,459	4,830,684	4,845,715	4,853,498
4,795,243	4,831,121	4,846,343	4,853,561
4,797,268	4,831,385	4,846,380	4,853,594
4,798,729	4,832,824	4,846,563	4,853,828
4,799,275	4,833,251	4,846,638	4,854,249
4,799,769	4,835,139	4,846,657	4,854,878
4,799,895	4,835,176	4,846,995	4,855,165
4,803,691	4,835,848	4,847,024	4,855,657
4,804,957	4,835,980	4,847,138	4,855,907
4,805,459	4,836,389	4,847,266	4,856,023
4,806,515	4,836,746	4,847,746	4,857,357
4,808,762	4,836,867	4,847,926	4,857,999
4,811,378	4,837,048	4,847,949	4,858,306
4,814,132	4,837,336	4,848,018	4,859,821
4,816,618	4,838,579	4,849,149	4,859,941
4,816,861	4,839,505	4,849,302	4,862,981
4,817,036	4,839,745	4,849,996	4,881,257
4,817,115	4,839,808	4,850,014	4,887,669
4,817,157	4,839,977	4,850,070	

Disclaimers

3,977,501.—*Juan Perez Alonzo*, Naucalpan de Juarez, Mexico. LUGGAGE CASE CONSTRUCTION. Patent dated Aug. 31, 1976. Disclaimer filed Jul. 17, 1989, by the assignee, Samsonite Corp.

Hereby enters this disclaimer to claim 1 of said patent.

4,428,428.—*Kenneth E. Smyrl*, Marrero, La.; *Bobby G. Redd*, Hobbs, N. Mex. TOOL AND METHOD FOR GRAVEL PACKING A WELL. Patent dated Jan. 31, 1984. Disclaimer filed Feb. 12, 1990, by the assignee, Dresser Industries, Inc.

The term of this patent subsequent to Feb. 1, 1990, has been disclaimed.

4,767,708.—*Edwin G. Minkley, Jr.*; *William E. Brown*, both of Pittsburg, Pa. ENZYME AMPLIFICATION AND PURIFICATION. Patent dated Aug. 30, 1988. Disclaimer filed Mar. 19, 1990, by the assignee, Carnegie-Mellon University.

Hereby enters this disclaimer to the remaining terms of said patent.

4,831,565.—*Steven J. Woodward*, Port Hope, Canada. PROCESS CONTROL EQUIPMENT FOR ADVERSE ENVIRONMENTS. Patent dated May 16, 1989. Disclaimer filed Mar. 19, 1990, by the assignee, Federal Industries Industrial Group Inc.

Hereby enters this disclaimer to claims 4 and 6 of said patent.

4,850,075.—*Franz Kresse*, Hilden; *Bernfrid Scheller*, Pulheim, both of the Fed. Rep. of Germany. MANUAL SURFACE WIPER ASSEMBLY WITH HANDLE AND SUPPORT THEREFOR. Patent dated Jul. 25, 1989. Disclaimer filed Dec. 21, 1989, by the assignee, Henkel Kommanditgesellschaft auf Aktien.

Hereby enters this disclaimer to claims 1, 2 and 9 of said patent.

4,909,803.—*Mohammed I. Aziz*, Cincinnati; *Ted L. Blaney*, West Chester, both of Ohio. DISPOSABLE ABSORBENT ARTICLE HAVING ELASTICIZED FLAPS PROVIDED WITH LEAKAGE RESISTANT PORTIONS. Patent dated Mar. 20, 1990. Disclaimer filed Feb. 5, 1990, by the assignee, The Proctor and Gamble Co.

The term of this patent subsequent to Feb. 28, 2006, has been disclaimed.

Dedication

3,745,820.—*Peter D. Weiner*, Bryan, Tex. LEAK-PROOF THREADED CONNECTIONS. Patent dated July 17, 1973. Dedication filed Feb. 28, 1989, by the assignee, Exxon Production Research Co.

Hereby dedicates to the Public the remaining term of said patent.

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PATENT EXAMINING CORPS

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STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner
CONDITION OF PATENT APPLICATIONS AS OF April 7, 1990

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	7-7-87
ORGANIC CHEMISTRY GROUP 120—S. N. ZAHARNA, Director	10-18-88
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. V. FISHER, Acting Director	5-27-87
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	4-5-88
BIOTECHNOLOGY, GROUP 180—J. E. KITTLE, Director	1-28-87
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. Kelly, Director	10-15-87
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	2-27-87
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—G. GOLDBERG, Director	2-29-88
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX,Director	11-9-88
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COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260 STEWART LEVY, Acting Director	3-30-88
DESIGN, GROUP 290—K. L. CAGE, Director	2-6-86
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HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	3-24-89
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Acting Director	6-23-88
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director	10-25-88
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—C. CROYLE, Acting Director	2-26-88
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	4-2-89

Expiration of patents: The patents within the range of numbers indicated below expire during April 1990 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,723,992 to 3,729,743 inclusive
Plant Patents ..... None

REEXAMINATIONS

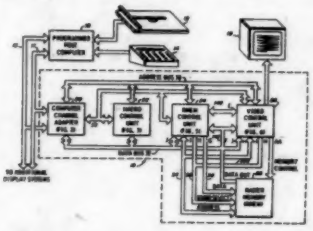
MAY 29, 1990

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 Re. 31,200 (1284th)
RASTER SCAN DISPLAY APPARATUS FOR DYNAMICALLY VIEWING IMAGE ELEMENTS STORED IN A RANDOM ACCESS MEMORY ARRAY

Josef S. Sukonick, Cupertino, and Greg J. Tilden, San Jose, both of Calif., assignors to Cadtrak Corporation

Filed Apr. 5, 1989, Ser. No. 82,592
Int. Cl.[5] G09G *1/06*
U.S. Cl. 340—721



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **2**, **3**, **5–9**, **11**, **13–17**, **20–23**, **25**, **27–31** and **33–45** is confirmed.

Claims **1**, **4**, **10**, **12**, **18**, **19**, **24** and **32** were previously cancelled.

Claim **26** is determined to be patentable as amended.

2. A computer graphics display system for use in association with a host computer to provide a visual display of graphics information contained therein, comprising:

a data bus;

an address bus;

display means for developing a visible image corresponding to video signals input thereto;

channel adapter means for providing an interface for communicating information including bits of graphics data between the host computer and said data bus and said address bus;

system control means communicatively coupled to said data bus and said address bus and operative to generate first and second control signals;

raster memory means including an array of N rows and M columns of storage sites each capable of storing a bit of graphics data corresponding to a picture element of a graphics image to be formed by said display means;

raster memory control means communicatively coupled to said address bus, said data bus, said raster memory means and said system control means, said raster memory control means being responsive to said first control signal and operative to cause bits of graphics data input from the host computer to be stored in said raster memory means;

video control means communicatively coupled to said address bus, said data bus, said raster memory means, said display means, and said system control means, said video control means being responsive to said second control signal and operative to read out in raster fashion data stored in any selected block of n rows and m columns of said storage sites, where n is an integer less than N and m is an integer less than M, and to use such data to generate a video signal for input to said display means whereby said display means is caused to display an image comprised of picture elements corresponding in the data obtained in the selected block of storage sites; said video memory control means including:

a first control memory for storing a first set of readout control instructions received from said system control means;

a second control memory for storing a second set of readout control instructions received from said system control means;

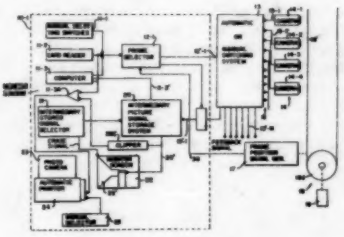
readout means for reading out bits of graphics data stored in said raster memory means; and

logic means for causing said readout means to read out data stored in a first selected block of storage sites of said raster memory means under control of said first set of instructions and to read out data stored in a second selected block of storage sites of said raster memory means under control of said second set of instructions, the data read out of said first and second blocks of storage sites being included in said video signal and said display means being caused to simultaneously display a first image corresponding to the data from said first block and a second image corresponding to the data from said second block.

B1 Re. 31,239 (1285th)
INFORMATION STORAGE AND REPRODUCTION SYSTEM

Jerome H. Lemelson, Metuchen, N.J., assignor to Patent Incentives, Inc., New York, N.Y.

Reexamination Request No. 90/001,584, Aug. 25, 1988.
Reexamination Certificate for Reissue Patent Re. 31,239, issued May 10, 1983, Ser. No. 68,484, Aug. 20, 1979.
Original No. 3,539,715, dated Nov. 10, 1970, Ser. No. 781,689, Nov. 21, 1968. Continuation of Ser. No. 247,999, Feb. 26, 1964, abandoned, which is a continuation-in-part of Ser. No. 615,417, Jun. 14, 1955, Pat. No. 3,003,109, Ser. No. 608,348, Jun. 27, 1957, Pat. No. 3,051,777, and Ser. No. 765,401, Oct. 6, 1958, abandoned. Request filed Aug. 25, 1988, Ser. No. 68,484
Int. Cl.[5] H04N *7/18*
U.S. Cl. 358—102



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–48** is confirmed.

1. An information storage and retrieval system comprising:

(a) a master information storage station having means carrying recorded information,

(b) signal input and output means for two-way communication with said master information storage station,
(c) reading means for scanning said recorded information and converting same to electrical signals, and means for generating said electrical signals on said output means of said master information storage station,
(d) first control means operative to cause said reading means to read selected information recorded on said information carrying means of said storage station,
(e) a plurality of monitor stations each having a visual display means for displaying information,
(f) an erasable signal recording means associated with the means displaying information at each monitor station for electrically energizing said display means to generate and retain a pictorial presentation of the information transmitted from said master information storage station,
(g) a plurality of communication channels for signal communication between said monitor station and said master information storage station,
(h) a plurality of second control means including at least one associated with each monitor station for selectively effecting a communication link between the associated monitor station and said master information storage station through one of said communication channels so as to establish two-way communication between the monitor station and said master information storage station,
(i) third control means at each monitor station for selectively controlling said first control means to cause said reading means to read selected information from the means carrying recorded information and to effect the transmission of selected information signals from said master information storage station to the monitor station from which said selective control is effected, and
(j) means at the monitor station for receiving the information signals transmitted thereto from the master information storage station and applying said signals to the erasable recording means of the monitor station to permit the information to be displayed by said display means.

B1 Re. 32,393 (1286th)

COMPOSITION FOR ENHANCING THE ADMINISTRATION OF PHARMACOLOGICALLY ACTIVE AGENTS

Karl A. J. Wretlind, Stockholm; Stellan Ljungberg, Lidingö; Ivan Hakansson, Stockholm, and Bengt M. Ajaxon, Upsala, all of Sweden, assignors to KabiVitrum AB, Stockholm, Sweden

Reexamination Request No. 90/001,586, Aug. 25, 1988.
Reexamination Certificate for Reissue Patent Re. 32,393, issued Apr. 7, 1987, Ser. No. 605,760, Aug. 14, 1984.
Original No. 4,168,308, dated Sep. 18, 1979, Ser. No. 854,404, Nov. 23, 1977. Division of Ser. No. 666,264, Mar. 12, 1976, Pat. No. 4,073,943, which is a continuation-in-part of Ser. No. 504,880, Sep. 11, 1974, abandoned, which is a continuation-in-part of Ser. No. 88,474, Nov. 10, 1970, abandoned, which is a continuation-in-part of Ser. No. 754,738, Aug. 22, 1968, abandoned. Request filed Aug. 25, 1988, Ser. No. 57,600
Claims priority, application Sweden, Sep. 1, 1967, 12159/67
Int. Cl.[5] A61K *31/55*
U.S. Cl. 514—219

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1, 7, 9–44** is confirmed.

Claims **2–6** and **8** were previously cancelled.

1. A composition for enhancing intravenous administration comprising a stable, oil-in-water emulsion capable of withstanding autoclaving, containing a pharmacologically inert lipoid as a hydrophobic phase dispersed in a hydrophilic phase and an effective dose of a pharmacologically active, oil-soluble agent predominantly dissolved in said lipoid at a fraction ratio thereto in the hydrophobic phase, said lipoid being dispersed in the emulsion as finely divided particles having a mean particle size less than 1 micron to achieve rapid onset of an acceptable therapeutic effect attributable to said effective dose of the active agent, said active, oil soluble agent being selected from a class of substances consisting of central depressants, analgesics, muscle relaxants, and vasodepressants.

B2 3,905,809 (1287th)

ALLOY FOR MAKING DUCTILE IRON

Andrew B. Malizio, Delran; Martin A. Rice, Florence, both of N.J., and Harry F. Brooks, Levittown, Pa., assignors to United States Pipe and Foundry Company, Birmingham, Ala.

Reexamination Request No. 90/001,270, Jun. 29, 1987.
Reexamination Certificate for Patent No. 3,905,809, issued Sep. 16, 1975, Ser. No. 434,403, Jan. 18, 1974.
Reexamination Certificate B1 3,905,809, issued Aug. 18, 1987.
Int. Cl.[5] C22C *37/00*
U.S. Cl. 420—578

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1–8** are cancelled.

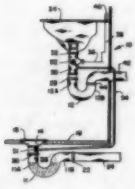
[1. A nodularizing composition for use in the production of nodular cast iron comprising at least two nodularizing elements in a silicon-iron alloy or mixture of silicon-iron alloys, said elements selected from the group consisting of magnesium, cerium, yttrium, lanthanum, neodymium and praseodymium with each being present in the alloy or alloys in an amount of from about 1 to 3 percent by weight of the composition and the total amount of nodularizing elements in the composition not exceeding more than about 12 percent.**]**

B1 4,218,786 (1288th)

WATER SAVING TRAP PRIMER

Joseph Taglarino, 107 S. Lincoln Ave., Tampa, Fla. 36609

Reexamination Request No. 90/001,180, Feb. 24, 1987.
Reexamination Certificate for Patent No. 4,218,786, issued Aug. 26, 1980, Ser. No. 10,373, Feb. 8, 1979.
Int. Cl.[5] E03C *1/24*
U.S. Cl. 4—206



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1, 2, 4, 5, 7** and **8** are determined to be patentable as amended.

Claims **3** and **6** dependent on an amended claim, are determined to be patentable.

1. A primer for a **[**first**]** *floor drain* water trap, *the floor drain water trap having an inlet and an outlet adapted to be connected to sewer system with the floor drain water trap being* located below a *sink* drain *having an inlet adapted to be connected to a drainage port of a sink for* receiving waste water *and*

an outlet adapted to be connected to a sewer system, comprising in combination:

a first fitting connected to the [first] *floor drain* water trap *above the normal water level therein;*

a second fitting connected to the *sink* drain *intermediate said inlet and outlet of said sinkk drain*; and

conduit means [interconnecting] *directly connecting* said first and second [fitting] *fittings* enabling the waste water received by the *sink* drain to be diverted by said conduit means to said [first] *floor drain* water trap for maintaining a constant water level in the [first] *floor drain water* trap to insure a proper seal therein upon use of the drain.

B1 4,323,071 (1289th)

VASCULAR GUIDING CATHETER ASSEMBLY AND VASCULAR DILATING CATHETER ASSEMBLY AND A COMBINATION THEREOF AND METHODS OF MAKING THE SAME

John B. Simpson, Menlo Park, and Edward W. Robert, Los Altos, both of Calif., assignors to Advanced Cardiovascular Systems, Inc.

Reexamination Request Nos. 90/001,327, Sep. 10, 1987 and 90/001,386, Dec. 1, 1987.

Reexamination Certificate for Patent No. 4,323,071, issued Apr. 6, 1982, Ser. No. 151,175, May 19, 1980.

Continuation-in-part of Ser. No. 123,713, Feb. 21, 1984, abandoned, which is a continuation of Ser. No. 899,061, Apr. 24, 1978, abandoned.

Int. Cl.[5] **A61M** *25/00*

U.S. Cl. 128—343

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–4, 6, 8, 9** and **11–16** is confirmed.

Claims **5, 10, 17, 20** and **21** are determined to be patentable as amended.

Claims **7, 18** and **19**, dependent on an amended claim, are determined to be patentable.

New claims **22–52** are added and determined to be patentable.

1. In a combination of a guiding catheter assembly and a dilating catheter assembly, the guiding catheter assembly comprising a first flexible tubular member formed of a material which has a low coefficient of friction, a second flexible tubular member encasing said first tubular member so that the first tubular member fits tightly in the second tubular member, said combined first and second tubular members having proximal and distal ends and a fitting mounted on the proximal ends, the dilating catheter assembly comprising a flexible tubular member, said tubular member of said dilating catheter assembly having proximal and distal ends and an inflatable annular portion formed integral with the tubular member of said dilating catheter assembly near the distal end thereof, a fitting mounted on the proximal end of the tubular member of the dilating catheter assembly, said dilating catheter assembly being disposed within said guiding catheter assembly and means for inflating and def[illegible]ing said inflatable annular portion.

B1 4,591,999 (1290th)

METHOD AND APPARATUS FOR AUTOMATICALLY SPACING CHARACTERS DURING COMPOSITION

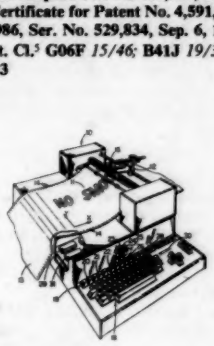
David J. Logan, Glastonbury, Conn., assignor to Gerber Scientific Products Inc., Manchester, Conn.

Reexamination Request No. 90/001,817, Jul. 25, 1989.

Reexamination Certificate for Patent No. 4,591,999, issued May 27, 1986, Ser. No. 529,834, Sep. 6, 1983.

Int. Cl.[5] **G06F** *15/46;* **B41J** *19/32*

U.S. Cl. 364—523



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claim **13** is confirmed.

Claim **14** is cancelled.

Claims **1–4** and **7** are determined to be patentable as amended.

Claims **5, 6** and **8–12**, dependent on an amended claim, are determined to be patentable.

New claims **15–20** are added and determined to be patentable.

1. A method for establishing the spacing between adjacent characters in a system for generating text lines of characters through the use of a computer and an associated computer memory device, said method comprising:

providing a memory device storing data describing a font of characters of a given size and including for each such character a first data set defining the shape of the character and a second data set defining approximately the shape of the left side of the character by way of a plurality of left side digital *space* values and the shape of the right side of the character by way of a plurality of right side digital *space* values, *the number of said left side digital space values being equal to that of said right side digital space values*, said left side digital *space* values being related to the shape of the left side of said character at respectively different levels along the height of said character and said right side digital *space* values being related the shape of the right side of said character at *said* respectively different levels along the height of said character,

reading from said memory device the data for a sequence of selected characters to be generated as a line of text,

for each adjacent pair of selected characters of said sequence, processing in said computer said plurality of right side digital *space* values of the left character and said plurality of left side digital *space* values of the right character in accordance with a *given* program to produce spacing data *defining the spacing to be introduced between said each adjacent pair of selected characters*, and

generating a line of characters using for the generation of each character said first data set defining its shape and

using for the [space] *spacing* between each adjacent pair of characters said spacing data derived from said processing of said digital *space* values[.].

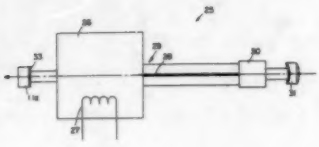
said step of processing in said computer the right side digital space values of the left character and the left side digital space values of the right character including for each of said different levels adding the right side digital space value to the left side digital space value to provide a sum value for each level, combining said sum value for one level with said sum value for another level to provide an openness factor related to the openness of the space between said adjacent pair of selected characters, and using said openness factor in the generation of said spacing data.

B1 4,615,034 (1291st)

ULTRA-NARROW BANDWITH OPTICAL THIN FILM INTERFERENCE COATING FOR SINGLE WAVELENGTH LASERS

Marc K. von Gunten; Benjamin H. Cook, both of San Jose, and David C. Gerstenberger, Mountain View, all of Calif., assignors to Spectra-Physics, Inc.

Reexamination Request No. 90/001,785, Jun. 13, 1989.
Reexamination Certificate for Patent No. 4,615,034, issued Sep. 30, 1986, Ser. No. 595,296, Mar. 30, 1984.
Int. Cl.[5] H01S *3/08*
U.S. Cl. 372—99



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **6**, **7**, **10** and **12–14** is confirmed.

Claims **1–5**, **8**, **9**, and **11** are cancelled.

Claim **15** is determined to be patentable as amended.

New claims **16–18** are added and determined to be patentable.

15. A method of producing single wavelength operation of [a] *an ion* laser of the kind which can oscillate on a number of lines simultaneously, at substantially any input power level, said method comprising,

coating a mirror surface with a coating having optical characteristics which provide for operation of said *ion* laser at any selected single or band of wavelengths, including any weak or low gain wavelengths, independent of their optical gains and at substantially any current or power level while suppressing non-selected wavelengths such that, said coating adjusts thresholds of all selected and non-selected wavelengths, including any dominant or high gain wavelengths, said coating having a coating reflectance to support laser oscillation for said selected single or band of wavelengths such that said selected single wavelength or band of wavelengths are above threshold, said coating further having acoating reflectance to suppress laser oscillation at said non-selected wavelengths, including dominant or high gain wavelengths, such that said non-selected wavelengths are below threshold,

mounting the mirror with respect to an optical cavity of the laser in a position where the mirror coating is effective to allow oscillation for said selected single or band of wavelengths, and

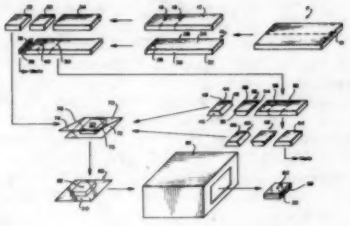
operating the laser at a high input power level, above a threshold at which the laser would otherwise begin to oscillate a number of lines simultaneously.

B1 4,642,970 (1292nd)

REUSABLE INSULATED BOX AND METHOD OF MANUFACTURE

William Bane, 1303 Del. Ave., Wilmington, Del. 19806

Reexamination Request No. 90/001,436, Feb. 12, 1988.
Reexamination Certificate for Patent No. 4,642,970, issued Feb. 17, 1987, Ser. No. 815,937, Jan. 3, 1985.
Int. Cl.[5] B65B *31/02*
U.S. Cl. 53—433



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–4** is confirmed.

Claims **5–7** are cancelled.

1. A process for manufacturing a reusable insulated box, comprising the steps of:

(a) providing a rectangular foam panel having one surface thereof coated with a reflective material;

(b) slicing said panel into first and second portions;

(c) slicing said first portion into a top and a bottom for the box, said top and bottom having corresponding configuration and dimension;

(d) slicing said second portion into a plurality of sides for the box, said second portion being sliced at an angle to said material for providing oppositely disposed mitred complementary edges for each of said sides;

(e) wrapping each of said top, bottom and sides in a heat shrinkable thermoplastic film;

(f) sealing the edges of said film and thereby encapsulating each of said top, bottom and sides in a film envelope;

(g) piercing the film adjacent the major surfaces of each of said top, bottom and sides and thereby providing each envelope with a pair of anti-blister openings; and,

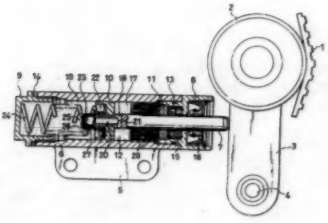
(h) heating each of said envelopes to a temperature sufficient to cause the film to shrink so that entrapped air vents through said anti-blister openings during shrinking and thereby permits the thermoplastic film to tightly sheath the top, bottom and sides and thereby provide top, bottom and side insert members for the box.

B1 4,708,696 (1293rd)

TENSIONER FOR TOOTHED DRIVE BELTS

Kazuo Kimura, Tokorozawa, and Masao Maruyama, Hanno, both of Japan, assignors to Tsubakimoto Chain Co., Osaka, Japan

Reexamination Request No. 90/001,874, Oct. 30, 1989.
Reexamination Certificate for Patent No. 4,708,696, issued Nov. 24, 1987, Ser. No. 872,928, Jun. 11, 1986.
Claims priority, application Japan, Aug. 30, 1985, 60-131595; Aug. 30, 1985, 60-131591; Aug. 30, 1985, 60-131592; Aug. 30, 1985, 60-131593; Aug. 30, 1985, 60-131594
Int. Cl.[5] F16H 7/12
U.S. Cl. 474—103



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1** and **11** are determined to be patentable as amended.

Claims **2–10** and **12–21**, dependent on an amended claim, are determined to be patentable.

New claims **22–25** are added and determined to be patentable.

1. A tensioner for a toothed belt comprising means providing a cylindrical interior wall, a piston slidable within, and substantially conforming to, the cylindrical wall, a rod connected to the piston and extending, substantially along the axis of the interior wall, from the piston to the exterior of the interior wall providing means, packing means surrounding the rod and, with the cylindrical wall and piston, forming a substantially enclosed first chamber on one side of the piston, means cooperating with the interior wall providing means and the piston forming a substantially enclosed second chamber on the opposite side of the piston, hydraulic fluid substantially filling both chambers, a first fluid passage having one-way check valve means allowing flow of hydraulic fluid from [one of the chambers] *said first chamber* to [the other] *said second chamber* as the piston moves in a direction to decrease the volume of said [one of the chambers] *first chamber*, spring means urging the piston in said direction, means providing a second fluid passage allowing relatively restricted flow of hydraulic fluid from said [other] *second* chamber to said [one of said chambers] *first chamber* as the piston moves in the opposite direction;

in which the second fluid passage [allowing relatively restricted flow of hydraulic fluid from said other chamber to said one of said chambers] is provided by a clearance between the piston and the cylindrical interior wall;

[in which the check valve is carried by the piston; and]

in which the first fluid passage comprises a first part extending axially through the piston and a second part, communicating with the first part, said second part extending [transversly] *transversely* through the rod; *and*

in which the check valve is carried by the piston and comprises a valve element, a valve seat, and means continuously urging the valve element toward engagement with the valve seat so that the check valve is always immediately closed when the piston stops moving in said direction to decrease the volume of said first chamber, whereby, whenever the piston begins to move in said opposite direction, the check valve is either already closed or is immediately closed, and substantially all of the flow of fluid from the second chamber toward the first chamber, during movement of the piston in said opposite direction, takes place through said second fluid passage.

B1 4,802,732 (1294th)

OPTICAL FIBER CABLE PREVENTING WATER FROM SPREADING TOWARD CABLE INTERIOR

Masumi Fukuma, and Nobuhiro Akasaka, both of Kanagawa, Japan, assignors to Sumitomo Electric Industries, Inc. Ltd., Osaka, Japan

Reexamination Request No. 90/001,857, Oct. 5, 1989.
Reexamination Certificate for Patent No. 4,802,732, issued Feb. 7, 1989, Ser. No. 98,839, Sep. 21, 1987.
Claims priority, application Japan, Sep. 19, 1986, 61-221384; May 13, 1987, 62-116659
Int. Cl.[5] G02B 6/44
U.S. Cl. 350—96.23

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–9** is confirmed.

1. An optical fiber cable comprising:

an optical fiber unit comprising:

a rod-like spacer formed with a plurality of grooves at its outer peripheral surface, and

at least one optical fiber tape disposed in each of said grooves; and,

at least one water blockage tape disposed in each of said grooves of said spacer in said unit together with said optical fiber tape, said water blockage tape comprising,

a film like flexible base member, and a water absorbing and swelling member bonded to at least one surface of said base member, said water absorbing and swelling member is formed of a cross-linked polyethylene oxide comprising,

polyethylene oxide having average molecular weight of not less than 20,000; and

one of two functional cross linking agent and three functional cross linking agent, having 0.1 to 1% by weight relative to said polyethylene oxide.

B1 4,806,579 (1295th)

POLYMER COMPOSITES

Paul D. Calvert, Lewes; Raymond M. Ellul, Blackboys, and Brian D. Moyle, Lewes, all of England, assignors to British Petroleum Co., London, England

Reexamination Request No. 90/001,908, Dec. 7, 1989.
Reexamination Certificate for Patent No. 4,806,579, issued Feb. 21, 1989, Ser. No. 7,002, Jan. 23, 1987.
Claims priority, application United Kingdom, Jan. 30, 1986, 8602318; May 20, 1986, 8612283
Int. Cl.[5] C08K *5/34, 5/21, 3/32, 3/10*
U.S. Cl. 524—99

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1-7 is confirmed.

1. A polymer matrix having grown therein in vitro and in situ, non-centrosymmetric crystals of an organic or inorganic compound capable of forming such crystals.

REISSUES

MAY 29, 1990

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 33,222

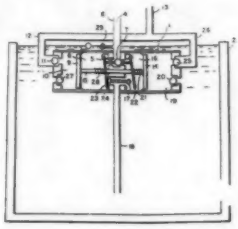
PRESSURE TRANSFER FLUID HEATER

William H. Zebuhr, Nashua, N.H., assignor to American Thermal, L.P., Del.

Original No. 4,658,760, dated Apr. 21, 1987, Ser. No. 745,444, Jun. 17, 1985. Application for reissue Apr. 20, 1989, Ser. No. 340,854

Int. Cl.[5] **F22B** *5/00*

U.S. Cl. 122—13 R **13 Claims**



[1. For providing a non-pressurized reservoir in a pressurized-fluid line, the combination comprising:

A. a vessel for containing fluid; and

B. a fluid-driven pump including a control inlet, a control outlet, a pump inlet, and a pump outlet, the pump being operable by flow of liquid into the control inlet, through the pump, and out the control outlet to draw liquid in the pump inlet, through the pump and out the pump outlet, the control outlet and the pump inlet being disposed in communication with the interior of the vessel so that fluid that has flowed from the control inlet through the pump and out the control outlet is discharged into the vessel and that fluid thus contained in the vessel is drawn by the pump from the vessel into the pump inlet, through the pump, and out through the pump outlet, whereby pressure is effectively transmitted from the fluid at the control inlet to the fluid at the pump outlet without imposing the pressure on the fluid in the vessel.]

Re. 33,223

ORGANIC POLYMERS CONTAINING TCNQ COMPLEXES AND STABILIZED AGAINST THE EMISSION OF HCN

Friedrich Jonas, Aachen, and Jurgen Hocker, Bergisch Gladbach, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Original No. 4,568,485, dated Feb. 4, 1986, Ser. No. 651,625, Sep. 17, 1984. Application for reissue Jan. 15, 1988, Ser. No. 144,801

Claims priority, application Fed. Rep. of Germany, Sep. 13, 1983, 3335513

Int. Cl.[5] **H01B** *1/06*

U.S. Cl. 252—518 **6 Claims**

1. A composition which comprises:

(a) a plastic material

(b) a charge transfer complex of tetracyanoquinodimethane, and

(c) an effective amount of a metal cation to stabilize the composition against the emission of HCN wherein said metal cation is *Ni (II)*Cu(II), Cu(I), Zn(II), Pd(II), Ag(I), Cd(II), Pt(II), Au(III) or Hg(II).

Re. 33,224

DRIVE FOR END LOADING AND TRANSVERSELY SHIFTING TAPE CARTRIDGE

Wolfgang Speigelstein, Glendale, Calif., assignor to Irwin Magnetic Systems, Inc., Ann Arbor, Mich.

Original No. 4,673,995, dated Jun. 16, 1987, Ser. No. 628,110, Jul. 6, 1984. Application for reissue Jun. 15, 1989, Ser. No. 371,416

Int. Cl.[5] **G11B** *5/008, 15/00, 17/00*

U.S. Cl. 360—93 **19 Claims**

12. A tape drive for a digital magnetic cartridge of the type described in ANSI X3.55-1977 having a generally flat rectangular body, a tape access opening in the frontal edge of the body, a hinged door normally covering the tape access opening and pivotable about an axis perpendicular to a plane of the body, and a tape drive capstan in the frontal edge of the body, said drive comprising:

a housing adapted to receive said cartridge by manual loading, said housing dimensioned to fit within a 5¼" footprint of a disk drive;

guide means defining a generally rectilinear loading path of travel within said housing for said cartridge;

a magnetic head mounted in said housing adjacent said path;

a motor capstan mounted in said housing adjacent said path;

means for shifting said cartridge transversely of said loading path to and from engagement with said magnetic head and said motor capstan when the cartridge is disposed within said housing;

said housing having a loading slot configured to permit only endwise loading of the cartridge into the housing; and

said drive including means for opening said door whereby to present the tape access opening to the magnetic head.

Re. 33,225

METHOD FOR MATING TELEVISION CRT CATHODE COMPONENTS

Janice L. Wichmann, Park Ridge, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.

Original No. 4,250,602, dated Feb. 17, 1981, Ser. No. 65,,481, Aug. 10, 1979. Continuation-in-part of Ser. No. 35,885, Apr. 4, 1979, abandoned. Application for reissue Jun. 2, 1989, Ser. No. 360,954

Int. Cl.[5] **H01J** *9/02*

U.S. Cl. 445—36 **1 Claim**

1. A method for mating production quantities of the tubular caps and shanks of the cathode assemblies of the TV CRT electron guns, each of said shanks having a base end larger in outside diameter than said cap, and a narrow end adapted to fit into said cap, the method comprising:

depositing a quantity of said caps onto a first shaker plate having a plurality of receptacles adapted to receive said caps open-end-down, by positioning in each receptacle a pin smaller in diameter than the opening in said caps and concentric with the axis of the said receptacle, said pin being effective to prevent the closed-end-down entry of said caps into said receptacle;

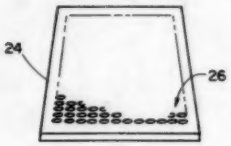
shaking said first shaker plate to cause said caps to fall open-end-down into said receptacles, and removing any excess of said caps;

positioning contiguous to said first shaker plate a second shaker plate having receptacles matching in number, location and alignment the receptacles of said first shaker plate, and inverting said plates in conjunctive alignment, causing said caps to fall open-end-up into the receptacles of said second shaker plate;

removing said first shaker plate and depositing a quantity of said shanks onto said second shaker plate and shaking said second shaker plate, causing said shanks to fall narrow-end-down into said receptacles and into said caps, said receptacles being adapted to reject the larger end of said shanks by virtue of being smaller in diameter than the larger end of said shanks;

removing any excess of said shanks;

repositioning and inverting said first and second shaker



plates, causing the mated cap-and-shank assemblies to fall shank-end-down into said receptacles and onto said pins of said first shaker plate, and removing said second shaker plate, said first shaker plate holding said assemblies cap-end-up for further processing.

PLANT PATENTS

GRANTED MAY 29, 1990

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,236

ROSE PLANT NAMED BURALP

Larry J. Burks, Rte. 22, Box 289, Tyler, Tex. 75704, assignor to Larry J. Burks, Tyler, Tex.

Filed Mar. 10, 1989, Ser. No. 321,721
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—21 1 Claim

1. A new and distinct variety of rose plant of the hybrid tea class, substantially as shown and described, characterized particularly by attractive deep red flowers which are long lasting on the plant and after cutting.

7,237

APPLE TREE: "SALI VARIETY"

Kasper B. Sali, 2004 Birchfield Rd., Yakima, Wash. 98901

Filed Jan. 11, 1989, Ser. No. 295,935
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—35 1 Claim

1. A new and distinct variety of apple tree substantially as shown and described.

7,238

GERBERA PLANT NAMED "BISMUT"

Th. A. Segers, RM Hoofddorp, Netherlands, assignor to Twyford Plant Laboratories, Inc., Santa Paula, Calif.

Filed Feb. 28, 1989, Ser. No. 317,241
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—68 1 Claim

1. The new distinct variety of gerbera plant herein described and illustrated and identified by the characteristics enumerated above.

7,239

IRIS PLANT NAMED TOKYO

Joseph P. van Eijk, Ve Bennekom, Netherlands, assignor to H.J.A. Rooyakkers B.V. and World Flower B.V., both of, Netherlands

Filed Apr. 10, 1989, Ser. No. 336,004
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—68 1 Claim

1. A new and distinct cultivar of Iris plant named Tokyo, as illustrated and described.

PATENTS

GRANTED MAY 29, 1990

ERRATA

For CLASS	See PATENT NO.
034-007	4,928,409
052-239	4,928,465
052-511	4,928,467
052-574	4,928,468
052-607	4,928,469
052-664	4,928,471
052-678	4,928,472
053-053	4,928,473
053-425	4,928,474
475-196	4,928,543
475-005	4,928,552
475-268	4,928,553
475-149	4,928,556
100-170	4,928,589
099-576	4,928,590
099-485	4,928,591
099-450	4,928,592
606-062	4,928,679
354-272	4,928,925
206-328	4,928,934
272-123	4,928,961
606-142	4,929,239
606-151	4,929,240
423-025	4,929,274
540-004	4,929,395
562-595	4,929,396
503-213	4,929,411
420-012	4,929,416
427-057	4,929,422
424-638	4,929,454
514-227	4,929,549
502-035	4,929,576
514-058	4,929,577
525-339	4,929,699
530-351	4,929,700
525-539	4,929,701
548-187	4,929,743
548-202	4,929,744
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364-525 4,929,824
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371-022 4,929,889
324-347 4,929,915
340-407 4,929,948
365-226 4,930,112

PATENTS

GRANTED MAY 29, 1990

GENERAL AND MECHANICAL

4,928,320

BASEBALL CATCHING APPARATUS

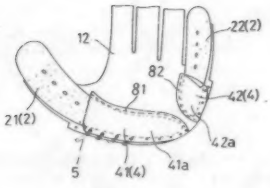
Akio Aoki, Osaka, Japan, assignor to Trion Corporation, Osaka, Japan

Continuation of Ser. No. 37,297, Apr. 8, 1987, abandoned. This application Nov. 15, 1988, Ser. No. 275,626

Claims priority, application Japan, Jan. 17, 1987, 62-5218[U]

Int. Cl.[5] A41D *13/10;* **A63B** *71/14*

U.S. Cl. 2—19 **6 Claims**



1. A baseball catching apparatus, comprising:

an outer face member constituting a ball-catching face of a palm side;

a string;

an inner face member which comes into contact with a palm, said inner face member being fastened at a lower edge portion thereof to said outer face member by means of said string;

holding means disposed at a predetermined position in between said outer face member and said inner face member, said holding means being provided at least at two positions separately from each other in an area extending from approximately a root of a thumb through the wrist to a root of a little finger, said holding means being secured to either of said outer face member and said inner face member over an entire periphery thereof except for opening portions thereof corresponding to positions of the root of the thumb and the root of the little finger, respectively; and

shock-absorbing means to be accommodated in said holding means and adapted for relieving ball-catching shock, said shock-absorbing means being formed thinner at a central portion thereof than at a peripheral portion thereof.

4,928,321

HOOD AND HOODED GARMENT

Marguerite A. R. Dobson, 43 Tredegar Square, London, England (E3 5AE)

Filed Nov. 10, 1988, Ser. No. 269,992

Claims priority, application United Kingdom, Nov. 10, 1987, 8726249

Int. Cl.[5] A41D *3/02*

U.S. Cl. 2—84 **2 Claims**

1. A garment comprising, a body portion, and a hood, said hood having oppositely facing front and rear portions, a center panel extending from said front portion to said rear portion, and at least two side panels, said center panel being attached at lateral edges to said side panels, said front portion having a face opening therein and said rear portion having indicia suggesting the appearance of a single face covering substantially the entirety of said rear portion of said hood, said body portion of said garment including a neck seam, and at least two raglan sleeves, said at least two raglan sleeves being separated by a spaced distance along said neck seam, said center panel of said hood joining said body portion at said neck seam along said spaced distance between said raglan sleeves, wherein said

center panel of said hood extends along said neck seam from one of said raglan sleeves to the other of said raglan sleeves.

4,928,322

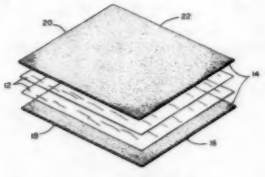
DISPOSABLE GLOVE

Athoi G. Bradfield, Edmonton, Canada, assignor to Bradfield AG Inc., Seattle, Wash.

Filed Jul. 22, 1988, Ser. No. 223,090

Int. Cl.[5] A41D *19/00*

U.S. Cl. 2—169 **18 Claims**



13. A disposable glove, comprising:

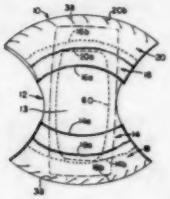
a. two plys of thermoplastic sheet material dispensed in a roll having opposed sides, the sheet material being sealed together to form a plurality of gloves, each glove having an opening along one of the opposed sides of the roll to permit hand entry, each glove being separated from an adjacent glove by perforations which extend between the opposed sides whereby the glove may be detached from the roll, the glove being a mitten having a thumb portion and a finger portion and having a partially perforated arcuate cut with a plurality of uncut portions along the length of the cut, spaced from the perforations which extend between the opposed sides and extending between the thumb portion and the finger portion of the glove, thereby permitting the thumb portion and the material adjacent the thumb portion to be manipulated relative to the finger portion after fracture of the uncut portions.

4,928,323

GARMENTS AND PARTS THEREOF

Efraim Nathan, Philadelphia, Pa., assignor to Lontex Corporation, Perkasie, Pa.

Filed Feb. 21, 1989, Ser. No. 313,403
Int. Cl.[5] A41B *9/00, 9/12*
U.S. Cl. 2—406 **9 Claims**



1. A crotch assembly for a garment comprising:

a fabric crotch piece having a pair of opposing sides defined in part by a part of longitudinally extending, opposing, generally concave edges;

inner fabric means on one side of the crotch piece attached to the crotch piece for receiving and retaining a generally elongated, removable absorbent pad of up to only a first length flush on the one side of the crotch piece, extending longitudinally along the crotch piece between the concave edges; and

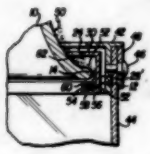
outer fabric means on the one side of the crotch piece attached to the crotch piece for receiving and retaining a generally elongated, removable absorbent pad of a length longer than the first length flush on the one side of the crotch piece, extending longitudinally along the crotch piece between the concave edges, at least one of the inner and outer fabric means comprising a pair of pockets on the one side of the crotch piece, each pocket of the pair extending generally between the concave edges of the crotch piece and each pocket of the pair having an open side facing the remaining pocket of the pair.

4,928,324

HARD HAT FACE SHIELD BRACKET

Jerry Evans, 36 Reynolds Dr., Hampton, Va. 23664, and Ravadean Asbely, 58 Linda Dr., Newport News, Va. 23602

Filed Oct. 18, 1988, Ser. No. 259,230
Int. Cl.[5] A42B *3/00*
U.S. Cl. 2—424 **3 Claims**



1. A bracket for securing a face shield onto a hard hat of a type having a rigid crown terminating at a front lower-level rim in front of a wearer's head, said bracket comprising:

an elongated channel-shaped member shaped in length generally similarly to the front lower-level rim, said channel-shaped member, when viewed in cross section, having a central vertical web and upper and lower flanges extending laterally from opposite ends of the web to define a continuous groove extending along the length of the channel-shaped member for receiving the front lower-level rim of the hard hat;

securing means for securing the channel-shaped member onto the hard hat with said front lower-level rim thereof being in said continuous groove; and

a face shield assembly including a pivot means for pivotally securing a transparent face protective shield to the channel-shaped member at points approximately aligned with temples of the head of wearer of the hard hat and for allowing said protective shield to be pivoted between a position below said hard hat in front of said wearer's head and a position above said hard hat away from the front of the wearer's head;

said lower flange of said channel-shaped member comprising an upwardly-directed wall for forming a continuous sump below the front lower-level rim for catching and retaining particles passing about the front lower-level rim inside said groove;

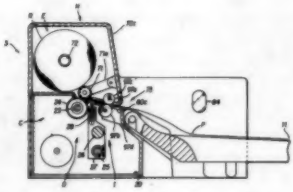
whereby said particles falling down the hard hat crown and passing about the lower-level rim inside the groove are caught in said sump and thereby prevented from falling in said wearer's face.

4,928,325

TOILET SEAT STRUCTURE CAPABLE OF AUTOMATICALLY FEEDING A SEAT COVERING PAPER ONTO A TOILET SEAT

Mitsuhiro Higuchi, and Hirofumi Yamamoto, both of Kitakyushu, Japan, assignors to Toto Ltd., Kitakyushu, Japan

Continuation of Ser. No. 197,531, May 23, 1988. This application May 11, 1989, Ser. No. 350,419
Claims priority, application Japan, May 28, 1987, 62-134531; Aug. 22, 1987, 62-208537; Oct. 28, 1987, 62-165962; Dec. 18, 1987, 62-322571
Int. Cl.[5] A47K *13/20*
U.S. Cl. 4—247 **3 Claims**



1. A toilet seat structure which comprises:

(a) a toilet seat body having an upper surface;

(b) a paper roll storage box and rotatably stored therein a paper roll having a length of paper sufficient for being cut into a plurality of seat covering papers;

(c) a paper feeding mechanism for feeding paper from the paper roll onto the upper surface of the toilet seat body, said paper feeding mechanism including a feed roller and a press roller biased together to form a nip through which the paper is conducted from the paper roll and which clamps the paper, the feed roller and the press roller being disposed below the paper roll;

(d) a paper clamping mechanism disposed at a position a predetermined distance away from the paper feeding mechanism toward the toilet seat body;

(e) a paper cutting mechanism for cutting the paper at a position a predetermined distance away from the front end of the paper to provide a piece of seat covering paper on the toilet seat body, the paper cutting mechanism being disposed between the paper feeding mechanism and the paper clamping mechanism for cutting the paper while the paper is clamped by the paper feeding mechanism and by the paper clamping mechanism;

(f) a control unit comprising a central processing unit for accurately controlling the operation of the paper feeding

mechanism and the paper cutting mechanism to feed a specified length of the paper onto the toilet seat body and cut the paper fed onto the toilet seat body to provide a seat covering paper on said toilet seat body;

(g) a control board for transmitting control signals to the control unit; and

(h) a functional casing provided at the rear of the toilet seat body, said functional casing containing all the above elements as one unit.

4,928,326

VACUUM SEWER ARRANGEMENT

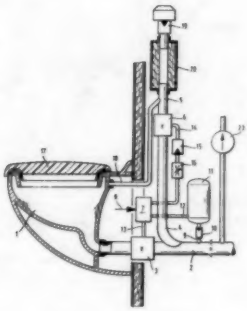
Henry Olin, Espoo; Gunnar Lindroos, Helsinki, both of Finland, and Sven Oldfelt, Vaxholm, Sweden, assignors to Oy Wärtsilä Ab, Helsinki, Finland

Filed Apr. 4, 1988, Ser. No. 177,070

Claims priority, application Finland, Apr. 6, 1987, 871491

Int. Cl.[5] E03D *5/00, 9/14*

U.S. Cl. 4—300 **17 Claims**



16. An arrangement according to claim **9**, wherein the lid is made of sound insulating material.

4,928,327

DEVICE FOR REDUCING RINSING WATER CONSUMPTION

Dieter Kuhn, Krauskopfalle 39, 6229 Georgenborn, Fed. Rep. of Germany

Filed May 11, 1988, Ser. No. 195,241

Claims priority, application Fed. Rep. of Germany, May 18, 1987, 3716624

Int. Cl.[5] E03D *1/35*

U.S. Cl. 4—395 **8 Claims**

1. A device for the reduction of the amount of rinsing water in a WC-water tank including a housing to be filled with water and having an outlet opening, a rinsing knob supported on the housing, a closing element operatively connected to the knob for closing and opening the outlet opening, the closing element being formed as a buoyant element, and pulling means connecting the closing element to the knob, said reduction device comprising a ring-shaped suppressing element provided on the closing element and made of elastic material with high specific weight, said suppressing element encircling the pulling means and exerting on the closing element a force which is greater than a force required to maintain the closing element in a buoyant state, said ring-shaped suppressing element including at least one ring; and a friction disc mounted on said pulling element between said closing element and said ring-shaped suppressing element for joint movement therewith for delaying closing of the outlet opening, said friction disc having a diameter which is larger than that of said ring-shaped suppressing element so that only a very short pressing of the knob enables the tank to discharge a predetermined portion of water which is smaller than an entire filling amount of water in the tank.

4,928,328

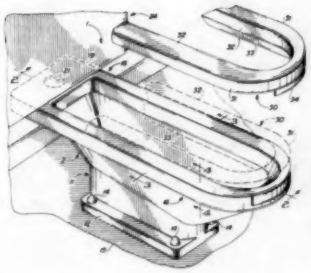
COMMODE AND REMOVABLE SEAT

John W. Davis, Rt. 2, Box F, Rayville, La. 71269

Continuation-in-part of Ser. No. 940,741, Dec. 11, 1986, abandoned. This application Aug. 15, 1988, Ser. No. 231,908

Int. Cl.[5] E03D *11/02*

U.S. Cl. 4—420 **2 Claims**



1. A commode for receiving handicapped and wheelchair-bound persons, comprising a bowl mounted on a floor and having a water trap therein and a hollow, bottom-perforated rim having a generally U-shaped portion defined by parallel rim portions connected by a curved rim frontal portion bordering the top of said bowl; said U-shaped portion extending integrally from a flush chamber provided in said rim opposite said rim frontal portion of said rim; a water tank stacked on said flush chamber, a valve seat provided in said water tank and said flush chamber and a flush valve seated in said valve seat; flush apparatus provided in said water tank and connected to said flush valve, for selectively opening said flush valve and allowing water to flow from said water tank to said flush chamber and through said rim; a generally U-shaped, elongated, reversible seat defined by parallel side portions connected by a curved frontal portion and having a substantially flat top segment and a substantially flat bottom bounded by an inside wall and an outside wall and further comprising a continuous, generally U-shaped inside flange extending downwardly from the inside edge of said seat for engaging the inside surface of said rim portions and locating said flat bottom on said rim portions and a curved from flange carried by said seat and downwardly extending from said outside wall of said seat for engaging the outside surface of said curved rim frontal portion when said seat is disposed on said rim in a first configuration, said curved front flange spanning a lateral distance less than the distance between said parallel rim portions so as to be positionable against said flush chamber while projecting downwardly between said parallel rim portions when said seat is reversed on said rim in a second configuration,the length of said side portions being less than said parallel rim portions such

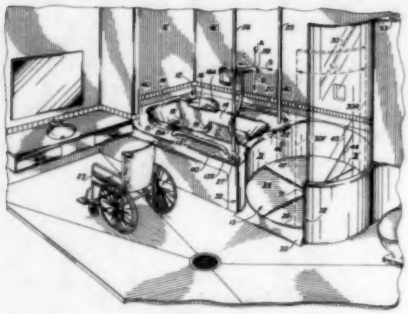
as to allow said inside flange to extend between said parallel rim portions but not into said curved rim frontal portion when said curved front flange engages said flush chamber with said seat positioned on said rim in said second configuration.

4,928,329

BATHROOM ASSEMBLY FOR HANDICAPPED INDIVIDUALS

Richard P. Palmeri, 6112 E. Mockingbird La., Paradise Valley, Ariz. 85253

Filed Apr. 25, 1988, Ser. No. 185,461
Int. Cl.[5] A47K *4/00, 3/022, 3/22*
U.S. Cl. 4—552 **10 Claims**



6. A bathtub including

(a) a tub having a floor and a surrounding wall for holding a quantity of water, said wall having a top portion;

(b) a support surface abutting adjacent to and extending away from said tub for a bather to position a wheelchair on;

(c) an opening in said tub wall located above said first level and said support surface and extending from the top portion of said wall downwardly a selected distance toward said floor for permitting a bather seated in a wheelchair setting on said support surface to transfer himself from said wheelchair to a seated position in said opening;

(d) a shower stall adjacent said tub and having access opening means in communication with said opening and having a shower stall floor which comprises said support surface;

(e) a wheelchair accessway formed in said shower stall;

(f) a faucet means mounted with respect to said tub and shower stall to have at least two operative positions,

(i) a first operative position for directing water into said tub, and

(ii) a second operator position for directing water into said shower stall, and,

(g) valve means for directing water into said faucet;

said valve means being positioned to be reached and operated by a bather seated in

(h) a wheel chair outside of said tub and said shower stall without having to reach out over said floor or said support surface to operate said valve means;

(i) a wheel chair inside of said shower stall;

(j) said opening in said tub wall; and,

(k) said tub.

4,928,330

HANDICAP BATHTUB LIFT

Arnold L. Moore, 1505 N. Locust St., P.O. Box 200, Canby, Oreg. 97013

Filed Sep. 16, 1988, Ser. No. 245,218
Int. Cl.[5] A47K *13/00*
U.S. Cl. 4—562 **3 Claims**

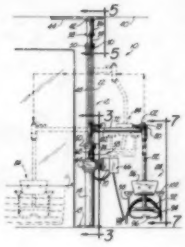
1. A handicap bathtub lift comprising:

an adjustable vertical post being attached to both floor and ceiling surfaces and including a base member with the lower portion thereof attached to the floor surface by a base plate and anchor bolts, a slotted frame and guide housing attached to the upper end of the base member by means of securing flanges and bolts, an uppermost section attached at the lower end thereof to the top section of the slotted frame and guide housing by means of securing flanges and bolts, said uppermost section being telescoped to adjust for various heights, a collar flanged ceiling anchor which fits over the top portion of the uppermost section and is attached thereto by means of set screws, and at the opposite end attached to the ceiling surface by means of securing and anchoring flanges and bolts;

a threaded screw journalled within the slotted frame and guide housing for rotation on bearings located at each end of the housing;

a carriage block threadably attached to the threaded screw and having a yoke section extending through a slot in the frame and guide housing;

means for selectively rotating the threaded screw;



a horizontal swinging arm with one end pivotally attached to the threaded screw through the carriage block by a swing pin and being rotatable in a 180° arc with respect to said post;

a pivot connection attached to the other end of the swinging arm by a thrust bearing and being rotatable in a 360° arc about a vertical axis;

a C-shaped carriage rod with a top section attached to the pivot connection, said carriage rod being disposed to support a seat assembly including a back rest attached to the C-shaped carriage rod by means of a clamp, a seat belt anchored at one end to the C-shaped carriage rod below the back rest clamp, a metal seat frame welded to the end of the C-shaped carriage rod and having a fiberglass seat attached thereto, and metal arm rest support bolted to the metal seat frame and having fiberglass arm rests attached thereto; and

swing stops attached to the horizontal swinging arm and being disposed to selectively engage said swing pin and said pivot connection to selectively prevent the pivotal movement with respect to said horizontal swinging arm.

4,928,331

ADJUSTABLE SEAT PITCH SOFA SLEEPER MECHANISM

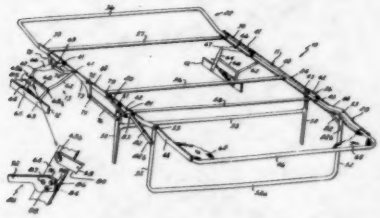
Dennis E. Arft, Joplin, Mo., assignor to Leggett & Platt, Incorporated, Carthage, Mo.

Filed Mar. 22, 1989, Ser. No. 327,017
Int. Cl.[5] A47C *17/22*
U.S. Cl. 5—13 **12 Claims**

11. A foldable sofa sleeper mechanism adapted to be mounted upon a sofa frame and stored within a storage enclosure of the sofa frame, said mechanism comprising

a bed frame having pivotally interconnected head, body, intermediate and foot sections each having a pair of opposed side rails, a mattress supporting fabric extending between said sections and connected thereto,

linkage mechanism for supporting said bed frame from the sofa frame, said linkage mechanism comprising a base plate adapted to be fixedly secured to said sofa frame, a front pilot arm pivotally mounted upon said base plate, a rear support link pivotally mounted upon said base plate, and a pair of center legs connected to a center actuating leg means operable to retract and extend said center legs, said sofa sleeper mechanism being movable between a folded position in which said bed frame and said linkage mechanism are folded and contained within said storage



enclosure of said sofa frame and said center legs are retracted, and an extended unfolded position in which said bed frame extends forwardly from said sofa frame and said center legs extend downwardly from said bed frame, and seat pitch adjustment means comprising a stop mounted upon said rear support link for varying the angle of pitch of said foot section of said bed frame by limiting and thereby controlling the downward movement of the rear of said folded bed frame, including the rear of said foot section, when said sofa sleeper mechanism is in a folded position within said storage enclosure.

4,928,332

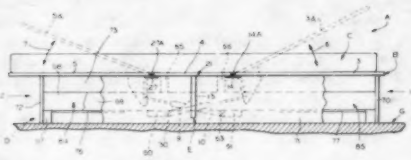
ADJUSTABLE MATTRESS FOUNDATION FOR BEDS

Ralph Ogden, 1304 Fisher Street, Munster, Ind. 46321, and Heikki Huik, 227 Washington Street, Rensselaer, Ind. 47978

Filed Nov. 7, 1988, Ser. No. 268,078

Int. Cl.[5] A61G *7/015, 7/018*

U.S. Cl. 5—68 **10 Claims**



1. An adjustable foundation for bed mattresses and operable by the bed user, said foundation comprising:

a head section articulated to a center section,

said sections each comprising a generally planar member extending longitudinally of said foundation,

means for mounting said center section in a stationary, substantially horizontal position,

said center section having opposite sides that extend longitudinally of said foundation and are spaced apart across the width of said foundation,

with said head section being hinged to one side of said center section for swinging movement with respect thereto about an axis extending transversely of said foundation,

means for selectively moving said head section relative to said center section in a predetermined movement range between a position of substantially coplanar relation with said center section and positions that are upwardly inclined relative to said center section,

means for locking said head section at said coplanar relation position, and at all other selected positions that are in said movement range of said head section,

said moving and locking means for said head section comprising a locking type fluid cylinder device for said head section,

said cylinder device being disposed and mounted below said foundation center section, and having one end of same fixed relative to said foundation center section and the other end of same in torque transmitting relation relative to said head section for swinging said head section about said axis to move said head section from said position to selected of said positions within its said movement range when said cylinder device is unlocked,

said cylinder device including means for unlocking same for said selected movement of said head section from said position to and between said positions,

and means for selectively controlling said movement of said head section and comprising:

a crank arm extending transversely of and below said foundation intermediate said center section and between said opposite sides of said center section and having a pivotal axis extending transversely of said foundation,

said crank arm defining adjacent each of said center section opposite sides a handle portion for selectively pivoting same by the bed user from either such handle portion from a bed user position lying on the bed, and from a selected one of said sides of said center section,

said crank arm axis ;having a neutral pivotal position,

means connecting said crank arm to said cylinder device unlocking means for activating said cylinder device in only one direction of pivoting of said crank arm from said neutral position thereof and for returning said cylinder device to locked relation when said crank arm is returned to said neutral position,

and means for biasing said crank arm for pivoting same back to said neutral position on completion of said selected actuation of said cylinder device.

4,928,333

COLLAPSIBLE ARTICLE OF FURNITURE

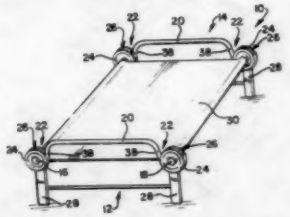
Werner H. Ewert, Johannesburg, South Africa, assignor to Hans Bonatz, Rosenweg, Fed. Rep. of Germany

Continuation of Ser. No. 109,950, Oct. 19, 1987, abandoned. This application Aug. 24, 1989, Ser. No. 398,295

Claims priority, application South Africa, Oct. 23, 1986, 86/8073

Int. Cl.[5] A47C *19/12*

U.S. Cl. 5—110 **7 Claims**



1. A collapsible article of furniture, such as a bed comprising: two, spaced apart, rigid head and foot board support members, each said support member having a base portion and a cylindrical element connected to and extending along the upper part of the base portion, each said cylindrical element having a pair of substantially U-shaped receiving portions extending substantially vertically upwardly from said base portion and being positioned at opposite ends thereof; a pair of elongated elements, each having a pair of disc components mounted at opposite ends thereof; a flexible web spanning said elongated elements and extending therebetween; and each said elongated element extending between said head and foot sup-

port members so that when said disc components are inserted into the U-shaped receiving portions, said flexible web is stretched and made taut.

4,928,334

JOINT STRUCTURE FOR FABRIC WEB HAVING HIGH MODULUS OF ELASTICITY

Tetsuo Kita, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 8,961, Jan. 30, 1987, abandoned. This application Jan. 23, 1989, Ser. No. 302,094

Claims priority, application Japan, Feb. 5, 1986, 61-14495; Apr. 22, 1986, 61-59573; Apr. 22, 1986, 61-59574

Int. Cl.[5] A47C *19/00*

U.S. Cl. 5—191 **6 Claims**

1. A joint structure for joining a fabric web as a spring element to a metal rod in an upholstered article, comprising:

a metal rod;

a fabric web having a high modulus of elasticity having an end portion folded on itself over said metal rod, providing folded and unfolded layers of the fabric web on opposite sides of said metal rod; and

a heat-fusible resin film sandwiched between said folded and unfolded layers of the fabric web and stretched at a temperature below its melting point for molecular orientation to provide increased mechanical strength in a direction in which said fabric web is subject to tension, said heat-fusible resin film being fused to unite said folded and unfolded layers of said fabric web.

4,928,335

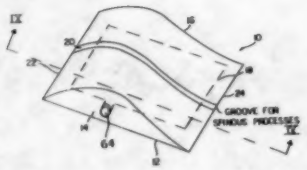
ORTHOPEDIC PILLOW AND SIZING KIT THEREFOR

John Pedrow, 14429 Rte. 30, North Huntingdon, Pa. 15642

Continuation-in-part of Ser. No. 164,971, Mar. 7, 1988, which is a division of Ser. No. 84,674, Aug. 12, 1987, Pat. No. 4,756,090. This application Dec. 5, 1988, Ser. No. 280,135

Int. Cl.[5] A47G *9/00*

U.S. Cl. 5—436 **4 Claims**



1. A cervical orthopedic pillow, said cervical orthopedic pillow comprising:

a block of deformable material;

a surface of said block of material being shaped to accommodate and support the neck and the cervical vertebrae of a user in a supine position;

a chamber provided in the interior of said block of material;

means for placing and retaining in said chamber a material, the temperature of which may be altered, the material retainable in said chamber comprising at least one nongaseous component;

said surface which is shaped to accommodate and support the neck and the cervical vertebrae of a user in a supine position having a substantially airfoil-shaped reverse curved surface when said block of material is viewed in elevation; and

a groove formed in said surface which is shaped for accommodating and partially surrounding the cervical vertebrae;

said groove running from one end of said pillow to the opposite end of said pillow.

4,928,336

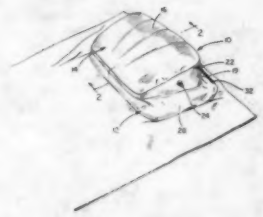
COMBINED INFLATABLE HEADREST AND STORAGE DEVICE

John J. Petillo, Sr., P.O. Box 47, Waretown, N.J. 08758

Filed Aug. 26, 1988, Ser. No. 236,854

Int. Cl.[5] A47C *20/00*

U.S. Cl. 5—441 **1 Claim**

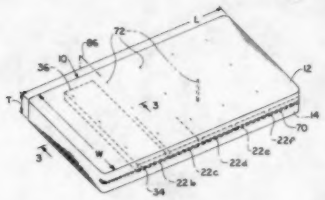


1. A headrest for use at the beach by a user in reclined position, said headrest comprising a storage base and an inflatable compartment, said inflatable compartment including a bottom wall of generally rectangular configuration, a top wall overlying said bottom wall, a peripheral side wall interconnecting the periphery of the bottom wall and top wall, said top wall being generally rectangular and slightly larger than the bottom wall, a plurality of partitions interconnecting the top wall and bottom wall, each of said partitions having a straight lower edge and an arcuate upper edge, and an inflation valve in said side wall to inflate the compartment into a generally rectangular pillow having a convex upper surface, said side wall including elongated portions forming the sides of the pillow and shorter portions forming the ends of the pillow, one of said elongated portions having a greater vertical height than the other, said shorter portions including an inclined upper edge extending between the upper edges of the elongated portions thereby orienting the top wall of the pillow in inclined relation to the bottom wall, said storage base including a bottom wall spaced below the bottom wall of the inflatable compartment, a peripheral side wall interconnecting said bottom walls to form a storage compartment, said storage base side wall including an elongated slit opening therein spaced from said bottom walls and generally parallel to the bottom walls, and closure means for closing said slit opening to enable the storage of articles therein and positioning of sand therein to serve as an anchor for the headrest at the beach when windy conditions are encountered, all of the walls and partitions forming the headrest being constructed of flexible vinyl material sealed together to enable the headrest to be folded into compact condition when not inflated and the storage base is empty.

4,928,337
COMPACTIBLE FUTON

Jeffrey B. Chauncey, 8100 McKim Ct., Los Angeles, Calif. 90046

Filed Apr. 4, 1989, Ser. No. 333,292
Int. Cl.[5] A47C 27/22
U.S. Cl. 5—465 12 Claims



1. A mattress that is changeable between a flat configuration and a folded configuration, comprising:

a foam layer having a pair of opposed upper and lower faces and a plurality of parallel channels, where said foam layer is of reduced thickness, and which separate said foam layer into a plurality of block portions arranged in a row;

a pair of cushioning layers each lying on an opposite one of said faces of said foam layer;

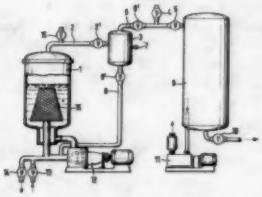
a thin flexible outer casing surrounding the combination of said foam layer and said cushioning layers thereon, and having upper and lower outer casing layers;

a plurality of tufts, each extending through said cuter casing layers, through said cushioning layers, and through said foam layer at said channels therein, including a plurality of tufts extending through each of said channels.

4,928,338
PROCESS FOR THE WET TREATMENT OF TEXTILE MATERIAL

Berthold Magin, Hassloch, Fed. Rep. of Germany, assignor to MTM Obermaier GmbH & Co. KG

Continuation-in-part of Ser. No. 25,513, Mar. 13, 1987, abandoned. This application Jan. 27, 1989, Ser. No. 303,963
Claims priority, application Fed. Rep. of Germany, Mar. 15, 1986, 3608742
Int. Cl.[5] D06B 3/10
U.S. Cl. 8—149.1 16 Claims

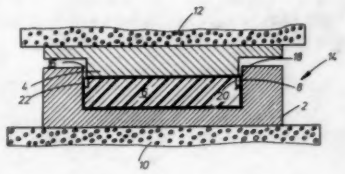


1. In a process for the wet treatment of materials by means of chemicals dissolved in a liquid contained in a vessel, including the steps of heating the liquid to a predetermined temperature and moving the liquid through the materials by means of a pumping unit at least during a part of the duration of the treatment, the improvement comprising initially heating the liquid to a temperature of between 50° and 80° C., subsequently reducing the pressure in the vessel until a preselected negative pressure value is reached, wherein the preselected negative pressure corresponds to a saturation vapor temperature which is between 5° and 30° C. lower than the predetermined temperature of the liquid, and generating a plurality of bubbles forming fine pores within the entire liquid, whereby an intensive additional movement is imparted to the liquid, wherein the bubbles are generated by introducing small quantities of a gas into the vessel, the gas being of the type which does not condense under operating conditions defined by the predetermined temperature, the preselected negative pressure value and the liquid, and which does not dilute the liquid.

4,928,339
POT-TYPE BEARING FOR CONSTRUCTIONS SUCH AS BRIDGES OR THE LIKE

Ernst Klawe, Erding, Fed. Rep. of Germany, assignor to Friedrich Maurer Söhne GmbH & Co. KG, Munich, Fed. Rep. of Germany

Filed Jan. 30, 1989, Ser. No. 303,330
Claims priority, application Fed. Rep. of Germany, Jan. 29, 1988, 3802580
Int. Cl.[5] E01D 19/06; F16C 27/06
U.S. Cl. 14—16.1 12 Claims



1. A pot bearing which includes a bearing pot having a cylindrical internal pot wall, a pressure pad mounted within said bearing pot and having a circumferential groove which extends about the upper peripheral edge thereof, a bearing cap including a cylindrical portion which extends within said bearing pot and has a lower portion which abuts against the upper portion of said pressure pad whereby said pressure pad supports said bearing cap, the outer periphery of said cylindrical portion being spaced apart from said cylindrical internal pot wall to provide a gap therebetween, and wherein the tilting of said bearing cap in said bearing pot is allowed by a minimum play of $\Delta d = g \times \sin \alpha$ in which Δd corresponds to the difference between the inner diameter of said cylindrical internal pot wall and the outer diameter of the said cylindrical portion of said bearing cap, g is the height of that part of said bearing cap which extends within said bearing pot, and α is the maximum occurring tilt angle of said bearing cap in said bearing pot, and a cylindrical bearing seal mounted within said circumferential groove of said pressure pad, said bearing seal having a peripheral surface for abutment against said cylindrical internal pot wall of said bearing pot and being of a height for engagement of the upper portion thereof with said lower portion of said bearing cap, said bearing seal overlapping said pressure pad and being of a width for sealing off the gap between the outer periphery of said cylindrical portion of said bearing cap when said bearing cap is tilted from the normal of said bearing pot as allowed by a minimum play of $\Delta d = g \times \sin \alpha$.

4,928,340
DOCK LEVELER

James C. Alexander, London, Canada, assignor to Serco Corporation, London, Canada

Filed Feb. 24, 1989, Ser. No. 315,060
Int. Cl.[5] E01D 1/00
U.S. Cl. 14—71.3 9 Claims

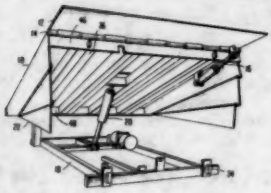
1. A dock leveler comprising:

a platform

hinge means coupling said platform to a stationary member,

means to move said platform from one position to another position, and

a series of spaced split box beams mounted to said platform to provide support for said platform with torsional flexibility,



wherein each of said split box beams comprise a pair of elongated angle sections held in place by web plates positioned between said angle sections, and

said angle sections separated to have a split extending the length of each said split box beam.

4,928,341

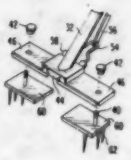
ATTACHMENT FOR A SQUEEZE MOP

Albert J. Pacione, 656 Elm St., Englewood, Fla. 34223

Continuation-in-part of Ser. No. 102,167, Sep. 29, 1987, Pat. No. 4,856,835. This application Feb. 23, 1989, Ser. No. 314,030

Int. Cl.[5] B08B *13/00*

U.S. Cl. 15—105 **6 Claims**



1. A litter picking conversion kit for converting a butterfly-type sponge mop into a litter picking device, wherein the butterfly-type sponge mop is comprised of:

an elongated handle having a support plate secured at one end thereof, a pair of operating plates pivotally secured to said support plate at opposite sides thereof, means for pivoting said operating plates from a first position wherein the operating plates are located in a common plane to a second position wherein said plates are disposed substantially parallel to each other and sponge means secured to said operating plates whereby water may be squeezed from the sponge means upon pivotal movement of said operating plates from said position to second position;

said conversion kit comprising rigid litter engaging means adapted to be secured to an undersurface of each of said operating plates in lieu of said sponge means and securing means for connecting said litter engaging means to said operating plates whereby upon pivotal movement of said operating plates from said first position to said second position, said litter engaging means will move toward each other to engage litter and hold it for pick-up and transfer to a suitable trash receptacle.

4,928,342

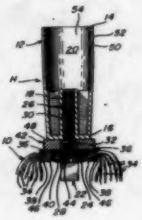
MOP HOLDER

Herbert D. Friedman, and Mark A. Friedman, both of Montreal, Canada, assignors to Cancot Industries Inc., Montreal, Canada

Filed Feb. 21, 1989, Ser. No. 312,470

Int. Cl.[5] A47L *13/24*

U.S. Cl. 15—145 **9 Claims**



1. A mop holder for a yarn-type mop head comprises a shank including a tubular sidewall, a bottom wall at a lower end of said sidewall and a threaded sleeve extending substantially at right angles from said bottom wall inside said shank, at least an upper part of said sidewall being adapted for connection to a mop handle; an elongated member having a threaded rod extending generally at right angles therefrom and intermediate thereof wherein the elongated member defines a pair of shoulders on either side of the rod, said rod comprising first and second threaded parts, said second threaded part being located intermediate said elongated member and said first threaded part, said second threaded part being of larger diameter than said first threaded part, said mop head defining an opening of larger diameter than said second threaded part of said rod for being positioned therearound; and a mop head retaining member including a threaded opening defined therethrough being adapted for threadably engaging said second threaded part of said rod whereas said sleeve of said shank is adapted for threadably engaging said first threaded part of said rod, whereby said mop head is secured to said mop holder by way of said mop head retaining member cooperating with said elongated member.

4,928,343

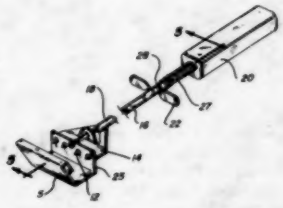
SCOURING PAD TOOL

Mark R. Kissinger, 1374 Buckwood La., Monument, Colo. 80132

Filed Oct. 31, 1988, Ser. No. 264,367

Int. Cl.[5] A47L *17/08, 13/04*

U.S. Cl. 15—209 D **3 Claims**



1. A holding implement for a flexible pad comprising in combination:

an elongated handle forming shaft;

a pad mounting shoe having upturned side members,

the first of which side members is attached to the shaft and contains at least one aperture

and the second of which side members has an overturned edge forming pad gripping means;

reciprocally movable pad clamping means slidably carried by the shaft to engage a pad disposed against the handle facing surface of the first side member where the pad clamping means includes at least one tooth projection sized and positioned to be introduced into the said aperture when the pad clamping means is moved toward the said first side member.

4,928,344

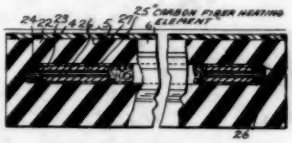
ELECTRICALLY HEATED WIPER BLADE UTILIZING FIBROUS CARBON HEATING ELEMENT

William R. Bliss, 120 Possum Hollow Rd., Newark, Del. 19711

Filed Apr. 18, 1988, Ser. No. 182,507

Int. Cl.[5] H05B *3/14, 3/36;* B60S *1/38*

U.S. Cl. 15—250.06 **5 Claims**



1. A heated wiper blade unit, comprising:

an elastic, electrically non-conductive wiper blade having a length and, in cross section, a geometric center;

a flexible, fibrous carbon heating element, including a plurality of elongated, fibrous carbon strands and a heat shrunk polymeric tube coaxially surrounding the strands, said heating element being disposed in the wiper blade, extending substantially along the length of the blade, and having first and second ends;

a first live wire entering said blade at an intermediate point along said length and extending through said blade to establish an electrical connection with said carbon strands at the first end of the heating element; and

a second ground wire entering said blade at an intermediate point along said length and establishing an electrical connection with the second end of the heating element.

4,928,345

HEATED WINDSHIELD WIPER BLADE AND HOLDER

Elliott A. Meltzer, Cherry Hill, N.J., and Albert A. DiIoia, Willow Grove, Pa., assignors to Thermo-Blade, Inc., Bensalem, Pa.

Continuation of Ser. No. 123,682, Nov. 23, 1987, abandoned. This application May 10, 1989, Ser. No. 351,292

Int. Cl.[5] B60S *1/04;* B60L *1/02*

U.S. Cl. 15—250.06 **17 Claims**

1. An electrically heated windshield wiper assembly adapted to be mounted on a wiper arm which sweeps across the windshield of a motor vehicle and adapted to be connected to an electrical source, said wiper assembly comprising:

wiper blade means for wiping said windshield;

blade carrier means adapted to receive said wiper blade means for holding said wiper blade means therein in conformation to the shape of windshield, said blade carrier means being connectable to said wiper arm; and

heating means passing through said blade carrier means and said wiper blade means for heating said wiper blade means and said blade carrier means, said heating means being adapted to be connected to said electrical power source;

said wiper blade means being comprised of:

resilient blade member means for wiping the surface of said windshield, said blade member means being elongated and having a passageway running longitudinally through the entire length thereof, said passageway being open at each end of said blade member means;

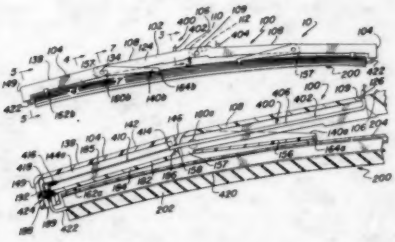
said blade carrier means being comprised of:

a body member having first and second ends,

a pair of blade holder members pivotally connected one each to said first and second ends of said body member, each blade holder member having an enclosed hollow interior compartment; and

said heating means being comprised of:

a pair of first electrical conductors passing through said body member of said blade carrier means,



a first heating element within each enclosed hollow compartment of said blade holder members, each first heating element being an exposed filament connected at a first end thereof to one of said first electrical conductors within said hollow compartment and spaced from the interior surface of said compartment,

a second heating element having first and second ends positioned within said passageway in said blade member means, said first and second ends of said second heating element being spaced within said passageway a distance from the respective ends of said passageway,

a plurality of second electrical conductors each having a first end and each second electrical conductor at said first end thereof being connected to said second heating element within said passageway in said blade member means, and

connecting means located at a second end of each of said first heating elements and at a second end of each of said second conductors for electrically connecting said first heating elements and said second electrical conductors.

4,928,346

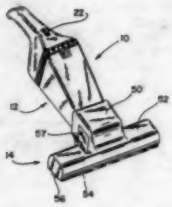
HAND-HELD VACUUM CLEANER WITH POWER BRUSH

Donald E. Elson, Baltimore, Md.; Burton E. Gerke, Jr., Newtown, Conn.; Michael E. Bitzel, Monroe, Conn.; Bruce A. Wilder, Clinton, Conn.; Stanley J. Rodowsky, Jr., Baltimore; William R. Lessig, III, Hunt Valley, both of Md.; Jeffrey S. Adams, Baltimore, and Todd A. Hagan, Hampstead, both of Md., assignors to Black & Decker Inc., Newark, Del.

Continuation of Ser. No. 929,103, Nov. 7, 1986, Pat. No. 4,841,594. This application Apr. 28, 1989, Ser. No. 344,383

Int. Cl.[5] A47L *5/26*

U.S. Cl. 15—338 **12 Claims**



1. A hand-held vacuum cleaner, comprising:

a dust bowl having first and second surfaces disposed at an angle relative to one another to converge toward an air intake opening at an end of said dust bowl;

a power brush attachment having an air inlet and an air outlet and detachably connectable to said end of said dust bowl, said power brush attachment including a rotatably mounted brush adjacent said air inlet thereof and including an electric motor connected to said rotatably mounted brush to effect rotation thereof;

a power unit at the end of said dust bowl opposite from said air intake opening end of said dust bowl and including another electric motor and means connected to said other electric motor for inducing an air flow into said air inlet of said power brush attachment to said air outlet thereof and into said air intake opening of said dust bowl;

means for detachably connecting said power brush attachment and said air intake opening end of said dust bowl, said connecting means including a first electrical contact pair mounted adjacent the air intake opening end of said dust bowl and a second electrical contact pair mounted on said power brush attachment, said first electrical contact pair detachably engagable with said second electrical contact pair, said connecting means including means for telescopically interengaging said air outlet of said power brush attachment and the air intake opening end of said dust bowl; and

an electrical circuit for electrically interconnecting said first- and second-mentioned electric motors through said first and second contact pairs and including a user-operable switch for selectively applying and interrupting the electrical circuit to said first- and second-mentioned electric motors.

4,928,347

VACUUM CLEANER DUST BOWL LATCH AND RELEASE SYSTEM

Charles Z. Krasznai, Trumbull, and Richard B. Kosten, West Haven, both of Conn., assignors to Black & Decker Inc., Newark, Del.

Filed Jan. 9, 1989, Ser. No. 294,615

Int. Cl.[5] A47L *5/24*

U.S. Cl. 15—344 **5 Claims**

1. A hand-held vacuum cleaner comprising:

a power unit;

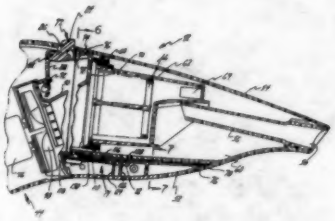
a dust bowl;

a first latch means for securing a first portion of said dust bowl to said power unit;

a second latch means for securing a second portion of said dust bowl to said power unit;

said first latch means including actuation means for releasing said first portion of said dust bowl from said power unit, in response to manual actuation thereof;

interconnection means operatively coupling said actuation means to said second latch means for operating said second latch means in response to said manual actuation of said actuation means to thereby release said second portion of said dust bowl from said power unit, whereby coordinated operation of said first and second latches is attained, said interconnection means includes a first member displaced by actuation of said first latch means and at least one leg fixed to said first member and contacting said



second latch means for operating said second latch means upon actuation of said first latch means; and

said second latch means includes:

a spring bar;

means for clamping a first portion of said spring bar to said power unit, and leaving a second portion thereof free to be displaced against the resilient resistence thereof; and

a latch cam fixed to said spring bar for engaging said dust bowl;

wherein said interconnection means includes at least one leg for contacting said spring bar, when actuated by the operation of said actuation means; and

wherein an end of said spring bar is displaced by said at least one leg sufficiently to disengage said latch cam from said dust bowl, whereby said second latch means is released and said power unit is released from said dust bowl.

4,928,348

METHOD AND APPARATUS FOR REMOVING AND COLLECTING DUST

James E. Clayton, P.O. Box 589, 30 Southard Ave., Hebertsville, N.J. 07727

Division of Ser. No. 894,386, Aug. 11, 1986, Pat. No. 4,780,927, which is a continuation of Ser. No. 650,197, Sep. 13, 1984, abandoned. This application Oct. 28, 1988, Ser. No. 263,699

Int. Cl.[5] A47L *5/14, 9/14*

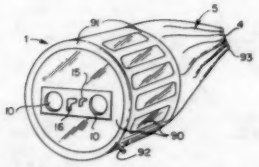
U.S. Cl. 15—345 **6 Claims**

3. An apparatus for removing and collecting dust from a brake assembly fixed to a horizontally extending vehicle axle before, during and after brake drum removal, said apparatus comprising:

a containment hood comprising shroud means and a visually transparent upper portion superposed above a lowest horizontal plane of the containment hood that comprises a substantially planar tray made of a material sufficiently strong and supported so as to bear at least the weight of a removed brake drum, an open front end defined within a vertical plane by an edge of said visually transparent upper hood portion and an edge of said planar lower tray and sufficiently large so that a brake assembly, with the brake drum still in place upon said axle horizontally may

enter into said containment hood through said shroud means connected to said open front end, said containment hood further comprising, at least two portals for providing manual access to said brake assembly;

wherein said containment hood open front end is adapted to be horizontally moved over a brake drum still in place upon an axle, whereupon said shroud means is adapted to substantially close said open end in a surrounding relationship with respect to said axle, whereupon further said brake drum may then be removed within said containment hood by manipulation through said portals and temporary placement upon said planar tray; and



a base supporting a self-contained vacuum means and filtering means; and

supporting means fixed to said base for supporting said planar tray and superposed containment hood at an adjustable height above said base so as to permit said horizontal movement of the containment hood over said axle; and

conducting means extending from proximate the planar tray and through the containment hood for allowing a current of air induced by said vacuum means to flow between the inside of said hood and high efficiency filtering means.

4,928,349

GROMMET STRUCTURE

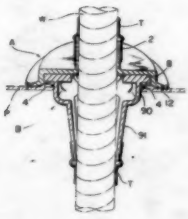
Ryuetsu Oikawa, and Akihiko Fujita, both of Shizuoka, Japan, assignors to Yazaki Corporation, Tokyo, Japan

Division of Ser. No. 217,029, Jul. 11, 1988. This application Apr. 14, 1989, Ser. No. 337,804

Claims priority, application Japan, Jul. 15, 1987, 62-107512[U]

Int. Cl.[5] F16L *5/02*

U.S. Cl. 16—2 **7 Claims**



6. A grommet as claimed in claim 5, wherein said stop portion is located from said hinge portion at a distance greater than a thickness of said resinous lock member.

4,928,350

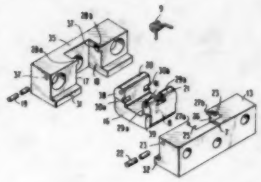
MULTIPLE AXIS HIDDEN HINGE

James C. Morgan, 2922 Vancouver Dr., Little Rock, Ark. 72204

Continuation-in-part of Ser. No. 229,437, Apr. 7, 1988, abandoned, which is a continuation-in-part of Ser. No. 59,430, Jun. 8, 1987, abandoned. This application Jul. 27, 1989, Ser. No. 385,701

Int. Cl.[5] E05F *1/10*

U.S. Cl. 16—297 **42 Claims**



1. A multiple axis hidden hinge suitable for joining a first member and a second member, said hinge comprising:

(a) a first mounting plate, said mounting plate including a pair of bracket members;

(b) a substantially U-shaped link having a base and two substantially parallel arms, the first arm of said link being pivotally attached near its end to and between said first plate bracket members, the axis of rotation of said attachment being substantially perpendicular to the U-shaped plane of the link, said link and first mounting plate being pivotable between a first limit and a second limit;

(c) a second mounting plate also having a pair of bracket members, the second arm of said link being pivotally attached near its end to and between said second plate bracket members, the axis of rotation of said attachment being substantially perpendicular to the U-shaped plane of the link, said link and second plate being pivotable between a first limit and a second limit; and

(d) means for increasing the inertial resistance between said first mounting plate and said link, partially restraining said first mounting plate and said link from being swung apart when they are at their first limit of pivot, said hinge including no such means for increasing the inertial resistance between said link and said second mounting plate.

4,928,351

METHOD AND DEVICE FOR OPERATING AN INSTALLATION FOR DIVIDING UP SLAUGHTERED POULTRY AND FOR TEMPORARILY INTERRUPTING THE TRANSPORT OF POULTRY CARCASSES OR PARTS

Adrianus J. van den Nieuwelaar, Gemert, and Petrus C. H. Janssen, Wilbertoord, both of Netherlands, assignors to Stork PMT B.V., Netherlands

Filed Dec. 1, 1988, Ser. No. 278,584

Claims priority, application Netherlands, Dec. 1, 1987, 8702887

Int. Cl.[5] A27C *21/00*

U.S. Cl. 17—11 **23 Claims**

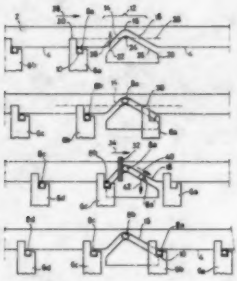
1. Installation for dividing up slaughtered poultry or parts thereof comprising:

a plurality of operating stations at which the poultry or parts may be operated upon; a transport track for transporting the poultry or parts thereof along a path past the operating stations in sequence; support and moving means at spaced intervals along the transport track for supporting a poultry or part thereof and moveable along the path of the transport track to the stations in sequence;

at a first one of the operating stations, an interrupting device for temporarily interrupting the transport by the respective moving means of the poultry or part then passing the first station, while maintaining the movement of the transport track and the moving means and of the other poultry

or parts thereof, the interrupting device comprising means for displacing the poultry or part off the path of the transport track;

examining means at the first station for examining at least



one criterion of the poultry or part; an evaluating device for evaluating the result of the examination by the examining means and a control device for controlling the subsequent operation upon the poultry or part depending upon the evaluation by the evaluating device.

4,928,352

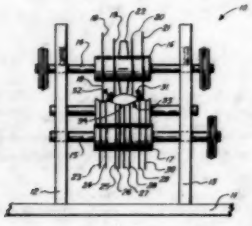
CRAWFISH PEELING APPARATUS

Glenn Thibodeaux, Rte. 3, Box 75-A, Church Point, La. 70525

Filed Jun. 9, 1989, Ser. No. 364,808

Int. Cl.[5] A22C *29/02*

U.S. Cl. 17—73 **9 Claims**



1. A crawfish peeling apparatus for separating the crawfish dorsal and ventral tail exoskeleton portions from the soft inner meat product comprising:

a. a frame;

b. scissor cutter means supported by the frame for making longitudinal edge cuts along the left and right sides of the crawfish tail by a scissor action of cooperating upper and lower blades positioned during cutting respectively to cut the dorsal and ventral tail shell sections so that the cuts extend substantially the full length of the crawfish tail;

c. feed means for advancing a crawfish tail to be peeled along a travel path that traverses the cutter means; and

d. positioning means for aligning the crawfish tail and cutter means during cutting so that both the dorsal and ventral tail exoskeleton portions are cut by the cutter means.

4,928,353

METHOD AND MEANS FOR EFFECTING A CONTROLLABLE CHANGE IN THE PRODUCTION OF A FIBER-PROCESSING MACHINE

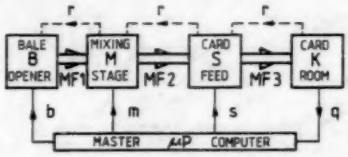
Robert Demuth, Nürensdorf; Paul Stäbeli, Wilen b. Wil; Rene Wäber; Christoph Gründler, both of Winterthur, and Franz Mächler, Neftenbach, all of Switzerland, assignors to Maschinenfabrik Rieter AG, Winterthur, Switzerland

Filed Oct. 3, 1988, Ser. No. 252,901

Claims priority, application Switzerland, Oct. 7, 1987, 03911/87

Int. Cl.[5] D01G *23/00*

U.S. Cl. 19—65 A **8 Claims**



1. A method of adjusting the production of a fiber-processing installation containing a plurality of consecutive different fiber-processing stages, comprising the steps of:

monitoring the total production of the fiber-processing installation in terms of material throughflow per unit time and per unit length of an effective working width of a last one of the plurality of consecutive different fiber-processing stages; and

changing a variable effective working width of at least one predetermined fiber-processing stage preceding said last one of the plurality of consecutive different fiber-processing stages of the fiber-processing installation in order to effect a change in the production of the fiber-processing installation in terms of said material throughflow per unit time and per unit length of said effective working width of said last one of said plurality of consecutive different fiber-processing stages.

4,928,354

METHOD AND APPARATUS FOR REMOVAL OF FIBER FLOCKS FROM FIBER BALES

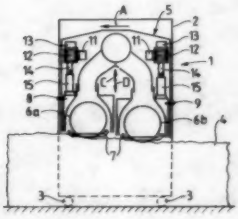
Daniel Hanselmann, and Walter Schlepfer, both of Winterthur, Switzerland, assignors to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Jan. 26, 1989, Ser. No. 302,815

Claims priority, application Switzerland, Feb. 4, 1988, 00400/88

Int. Cl.[5] D01B *1/00*

U.S. Cl. 19—97 **23 Claims**



1. A method of removing fiber flocks from a row of fiber bales, said method comprising the steps of

passing at least a pair of parallel rotating removal rolls over the fiber bales for removing fiber flocks from the bales: and

maintaining the rolls at different levels from each other

during travel over the bales to obtain different depths of penetration of the rolls into the fiber bales.

4,928,355

LAP EVENER FOR A FIBER PROCESSING MACHINE

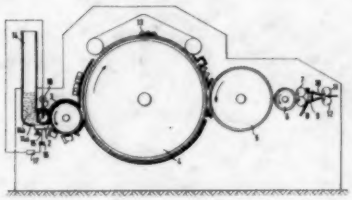
Ferdinand Leifeld, Kempen, Fed. Rep. of Germany, assignor to Trützschler GmbH & Co. KG, Monchengladbach, Fed. Rep. of Germany

Filed Oct. 3, 1988, Ser. No. 261,518

Claims priority, application Fed. Rep. of Germany, Oct. 5, 1987, 3733631

Int. Cl.[5] D01G *15/40*

U.S. Cl. 19—105 **11 Claims**



1. In a textile fiber processing assembly including

a feed chute adapted to be charged with fiber material and having a bottom portion provided with an outlet opening through which the fiber material is discharged;

a fiber feeding arrangement positioned externally of the feed chute downstream of the outlet opening as viewed in a direction of advance of the fiber material upon discharge thereof from said outlet opening; said fiber feeding arrangement including two cooperating components; one of said components being a feed roller and the other of said components being a counterelement; one of said components being stationarily supported and the other of said components being movably supported to allow excursions thereof towards and away from the respective other component as a function of the thickness of fiber material passing through the fiber feeding arrangement;

a drive motor connected to said feed roller for rotating said feed roller; and

a carding machine having an input and licker-in situated at said input downstream of said fiber feeding arrangement and arranged for receiving the fiber material advanced by said fiber feeding arrangement;

the improvement wherein said feed roller adjoins said outlet opening for drawing fiber material from the feed chute through said outlet opening; further wherein said feed roller immediately adjoins said licker-in for advancing the fiber material directly to said licker-in;

the improvement further comprising a measuring member connected to the movably supported component and arranged for generating signals representing said excursions; and control means for connecting said measuring member to said drive motor for controlling the rotation of said feed roller as a function of said signals.

4,928,356

TOP COMB FOR TEXTILE MACHINERY AND PROCESS FOR CLEANING SAME

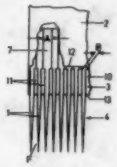
Josef Egerer, Schwabach, Fed. Rep. of Germany, assignor to Staedtler & Uhl, Schwabach, Fed. Rep. of Germany

Filed Aug. 30, 1988, Ser. No. 239,339

Int. Cl.[5] D01G *19/00*

U.S. Cl. 19—129 R **13 Claims**

1. Needle strip, in particular a top comb, for textile machinery and the like, comprising at least one row of needles and first and second cover plates, said first and second cover plates holding in place said row of needles, wherein the points of the needles extend to a certain distance past the bottom edge of said cover plates, thus forming open passageways between the needles, and wherein a cleaning appliance for the removal of deposits that have settled in the open passageways is associated



with the needle strip, characterized in that the needle strip comprises at least one air channel (**11**) in order to conduct a flow of air (**17**) through or past the open passageways (**F**) to clean them.

4,928,357

LAP GUIDE ARRANGEMENT FOR A COMBING MACHINE

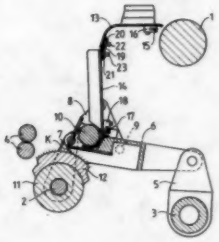
Heinz Clement, Winterthur, Switzerland, assignor to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Apr. 5, 1989, Ser. No. 333,459

Claims priority, application Switzerland, Apr. 19, 1988, 01425/88

Int. Cl.[5] D01G *19/16*

U.S. Cl. 19—225 **20 Claims**



1. A lap guide arrangement for a combing machine comprising

a first guide plate having first means at one end for mounting on a frame adjacent a lap roller;

a second guide plate having second means at one end for moutning on a reciprocal nipper adjacent a feed roller; and

at least one strip of flexible material fixed to and between said plates to permit pivoting of said plates relative to each other.

4,928,358

PULL TAB FOR SLIDE FASTENER SLIDERS

Susumu Ishii, Kurobe, and Hideyuki Matsushima, Toyama, both of Japan, assignors to Yoshida Kogyo K.K., Tokyo, Japan

Filed Feb. 9, 1989, Ser. No. 307,959

Claims priority, application Japan, Feb. 12, 1988, 63-17787[U]

Int. Cl.[5] A44B *19/26*

U.S. Cl. 24—431 **6 Claims**

1. A pull tab for slide fastener sliders of the type having a one-piece pull tab body formed of a soft elastic material such as soft synthetic rubber or soft synthetic resin, and pivotally connected to a support lug on a slider body by means of a connector, said one-piece pull tab body having an integral grip

portion for being gripped by the user's fingers and constituting a major part of said pull tab body, wherein the improvement comprises: a single soft elastic grip mound provided integrally on said grip portion and raising from at least one of front and rear surfaces of said pull tab body, said grip mound having a

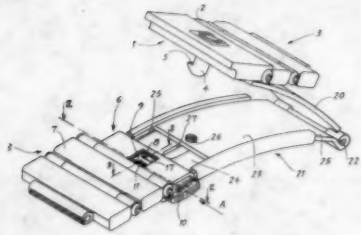
roughened outer surface of a leather-like appearance and being elastically deformable to fit the shape of the user's finger when said grip portion is gripped, said grip mound being inwardly spaced from an outer peripheral edge of said pull tab body and having an outer peripheral wall extending substantially parallel to said outer peripheral edge of said pull tab body.

4,928,359

EXTENDABLE BRACELET CLASP WITH FINE ADJUSTMENT

Gaston Gagnebin, Bienne, Switzerland, assignor to Omega SA, Bienne, Switzerland

Filed Jul. 14, 1989, Ser. No. 379,814
Claims priority, application France, Jul. 15, 1988, 88 09716
Int. Cl.[5] A44C *5/24*
U.S. Cl. 24—71 J **5 Claims**



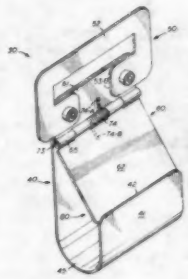
1. A bracelet clasp including a first element attached to one end of the bracelet and a second element attached to the other end of the bracelet the longitudinal extent of said bracelet between said ends defining a longitudinal direction, the first and second elements cooperating to assure latching of the clasp by superposition of said elements, the first element bearing a hook provided with a beak directed perpendicular to the longitudinal direction of the bracelet and the second element being pierced with at least one opening into which the hook may be introduced, a catch being captively mounted under the second element and slidable relative thereto in a direction perpendicular to said longitudinal direction, the catch exhibiting a portion emerging laterally from said second element in a direction perpendicular to said longitudinal direction under the return force of a spring, said portion serving as a push button adapted to be operated by a finger so as to displace the catch against the spring action, said catch being provided with a first hole partially set off relative to the opening in the second element so that when the hook is introduced into the opening of the second element it then engages with said first hole of the catch so as to displace said catch gradually against the action of the spring until the beak of the hook passes under the catch and latches the first element to the second element, said catch being displacable by finger pressure on the push button so as to align said opening with said first hole thus to permit opening of the clasp, and said catch being provided with a second hole identical with the first hole and placed therebeside in the longitudinal sense of the bracelet, the hook thus being capable of introduction into the first or the second hole in accordance with whether the bracelet is to embrace tightly or loosely the member bearing it.

4,928,360

BOARD ANCHOR

John W. Wilbanks, 6806 Log Hollow, #210, Houston, Tex. 77088

Filed Jul. 10, 1989, Ser. No. 377,145
Int. Cl.[5] A44B *13/02*
U.S. Cl. 24—235 **6 Claims**



1.

A spine board anchor comprising:

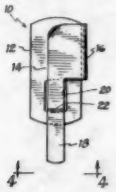
A body portion having a hook-like portion with a leading edge adapted to pass through a board aperture and an adjacent leg extending laterally from said hook-like portion, said leg having a trailing edge and a pair of spaced apertures through said leg adjacent said trailing edge;

a bifurcated gate, said gate including a pair of spaced jaws linked by pivot means and coiled spring means biasing one of said jaws toward a position blocking removal of said board anchor from said board, the other of said jaws including a pair of spaced apertures therethrough, each of said jaws including pivot-pin-accommodating tube means, pivot pin means insertable through said tube means, said spring means encircling said pivot pin and adapted to regulate movement of said one jaw relative to the other jaw;

a retainer member having a central slot therethrough adapted to receive a section of webbing, said retainer also having a pair of apertures therethrough; and

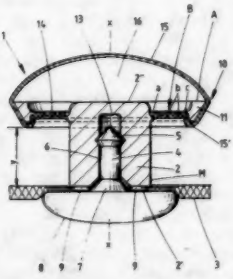
said body portion, gate and retainer are each fabricated of materials rendering them autoclavable and each of their respective pairs of apertures are aligned and removably secured together, sandwich style, by removable fastener means, said sandwich comprising a central member formed by said gate's other jaw and outer members formed respectively by said body portion's adjacent leg and said retainer member, said retainer's slot, stubs and said removable fasteners comprising means permitting ready field disassembly and assembly of said anchor.

4,928,361
PAPER CLIP
James Brown, 2330-10 Grove Ave., San Diego, Calif. 92154
Filed Oct. 10, 1989, Ser. No. 418,521
Int. Cl.[5] B42F *1/02*
U.S. Cl. 24—67.9 **4 Claims**



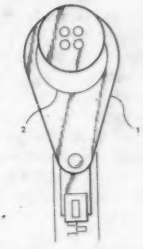
1. A clip comprising:
(a) a back panel;
(b) a resilient front panel connected to said back panel along the edge thereof adjacent the upper edge of said back panel;
(c) said back panel extending down further than said front panel, and said panels lying substantially flush against one another; and
(d) a resilient spring finger extending down from said front panel and being pressed against said back panel and being oriented to at least partially press against paper captured between said front and back panels, wherein said back panel has an opening in the lower portion thereof aligned with said finger such that said finger extends across said opening and extends well past the lower edge of said back panel.

4,928,362
BUTTON, PARTICULARLY FOR ARTICLES OF CLOTHING
Wolfgang Collas; Günter Wolfertz, and Roger Wolfertz, all of Wuppertal, Fed. Rep. of Germany, assignors to Schaeffer GmbH, Wuppertal, Fed. Rep. of Germany
Filed Oct. 20, 1988, Ser. No. 260,801
Claims priority, application Fed. Rep. of Germany, Oct. 24, 1987, 8714192[U]
Int. Cl.[5] A44B *18/00, 42/00*
U.S. Cl. 24—90 R **8 Claims**



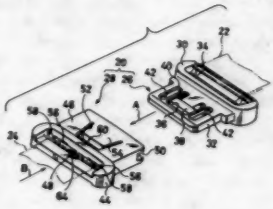
1. A button comprising
a button shank adapted to be fastened to an article of clothing; and
a button plate integrally formed with said shank; and wherein
said button plate comprises an edge bead concentric to an axis of the shank, and a bridge of flexible material connecting the bead to the shank; and wherein
said bridge receives buttoning forces and concentrically surrounds the button shank; and
said bridge is sufficiently flexible to permit displacement of said bead along an axis of said shank.

4,928,363
ZIPPER SECURING RING
Wayne Easton, R.R. 1, Box 156H, East Carondelet, Ill. 62240
Filed Jun. 26, 1989, Ser. No. 371,318
Int. Cl.[5] A44B *19/26*
U.S. Cl. 24—390 **1 Claim**



1. A fastening attachment secured to the top portion of a zipper slide to prevent inadvertent opening of the closure wherein the improvement comprises:
(a), a flat strip of metal having an orifice at one end;
(b), the strip of metal tapering down to a point at the other end;
(c), the diameter of the orifice sufficiently large to encircle the securing button on the waist band of a mans jeans, or trousers;
(d), a hook shaped clamp, extending normal to the surface of the flat strip, at the pointed end of the strip;
(e), the hook clamp having a width compatible with the orifice in the top of the slidable zipper fastener; and,
(f), hook of the flat metal strip engaging the slidable zipper with the top orifice over a support button locks the zipper in the upward closed position.

4,928,364
BUCKLE
Yasuhiko Ikeda, Toyonaka, Japan, assignor to NIFCO, Inc., Yokohama, Japan
Filed Jun. 20, 1989, Ser. No. 368,758
Claims priority, application Japan, Jun. 22, 1988, 63-82767[U]
Int. Cl.[5] A44B *11/25*
U.S. Cl. 24—614 **6 Claims**



1. A push-type buckle, comprising:
a first buckle body having an engaging portion;
a second buckle body having an opening into which said first buckle body is inserted;
a receiving portion provided upon said second buckle body

for housing and engaging said engaging portion of said first buckle body upon insertion of said first buckle body into said second buckle body so as to prevent withdrawal of said first buckle body from said second buckle body but permitting further insertion of said first buckle body into said second buckle body;

a movable member provided upon said first buckle body for movement in the direction of insertion into and withdrawl from said second buckle body and functioning to release said engagement defined between said first and second buckle bodies upon further insertion of said first buckle body into said second buckle body from the state of engagement; and

elastic flexing portions, formed upon a portion of said receiving portion of said second buckle body facing the insertion end of said first buckle body, extending in a direction perpendicular to the directions of insertion and withdrawal of said first buckle body with respect to said second buckle body and being elastic in the direction of insertion of said first buckle body for engaging said engaging portion of said first buckle body with a first predetermined force in order to prevent insertion of said first buckle body into said second buckle body beyond said, state of engagement, and for defining a second predetermined force against which said first buckle body must be moved from said state of engagement and in said direction of insertion in order to achieve disengagement of said first buckle body from said second buckle body.

4,928,365

BUCKLE

Kazumi Kasai, Namerikawa, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan

Filed Jun. 23, 1989, Ser. No. 370,717

Claims priority, application Japan, Jun. 25, 1988, 63-84146[U]

Int. Cl.[5] A44B *11/25*

U.S. Cl. 24—635 **9 Claims**

1. A buckle comprising: a male member having a tongue-shaped presser having on its lower side a pair of engaging legs; a female member being in the form of a case and including in its upper side an aperture for insertion of the engaging legs, and a pair of transversely spaced resilient arms formed integrally to one end of the female member and terminating in free ends for angular movement aroung their proximal ends against their own resiliency, the arms having engaging means for engagement with the engaging legs when the engaging legs are forced through an aperture; and an uncoupling means for bringing the engaging means out of engagement with the engaging legs, the uncoupling means having a disk rotatably mounted on the upper side of the female member; the uncoupling means further including linking means for so operatively linking the disk and the resilient arms that the rotation of the disk causes the resilient arms angularly move against their own resiliency, thereby bringing the engaging means out of engagement with the engaging legs.

4,928,366

SIMPLIFIED AND IMPROVED SAFETY-BELT BUCKLE

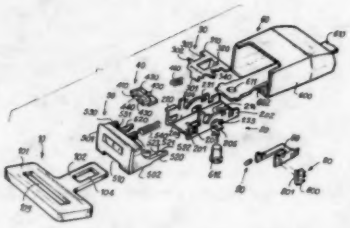
Jean-Noël Ballet, Aillevilliers, France, assignor to ECIA - Equipements et Composants pour l'Industrie Automobile, Audincourt, France

Filed May 3, 1989, Ser. No. 346,683

Claims priority, application France, May 6, 1988, 88 06170

Int. Cl.[5] A44B *11/25*

U.S. Cl. 24—641 **17 Claims**



1. Safety-belt buckle in particular for a land-type automotive vehicle, which is intended to join a strap to an anchorage point and which consists, in particular, of a latch (**10**) and of a keeper comprising, among other things, a base (**20**) and, carried by the latter, a lock (**30**), an ejector guide (**40**), an actuating button (**50**) and, if necessary, a protective covering (**60**), in which this base (**20**) defines a channel (**200**) intended to receive at least partially the latch (**10**), this lock (**30**) being mounted on this base (**20**) by means of an articulation (**230**) which allows it to move in practice only by pivoting so as to be movable between at least two positions towards which it is elastically biased, a first releasing position where the latch (**10**) is unlocked and the lock (**30**) is away from the ejector guide (**40**) and a second retaining position where the latch (**10**) is locked on the keeper by the lock (**30**), this ejector guide (**40**) having a seat (**400**) intended to receive the latch (**10**) at least partially and being mounted on this base (**20**) so as to be displaceable there in translation such that it is movable between a rest position towards which it is normally elastically biased and which it occupies when the lock (**30**) is in its first position and a set position which it occupies when the lock (**30**) is not in its first position, this actuating button (**50**) being mounted on this base (**20**) so as to be displaceable there in translation such that it is movable between an inactive position towards which it is normally elastically biased and an active position in which it causes the latch (**30**) to pass into its first position, characterized in that this lock (**30**) is deformable elastically towards a third permanently locked position where it is directly

and positively locked to the base (**20**) only through a direct engagement of a lock edge (**71**) with a permanent-locking notch (**72**) of the base (**20**) when it occupies its second position and wherein the locked buckle is subjected to a force tending to open it which is greater than a given value and in that operating and locking means (**70**) associate this actuating button (**50**) and this lock (**30**) and this base (**20**) such that in a first mode, when a force tending to open the locked buckle does not exceed this given value, when the actuating button (**50**) passes from its inactive position to its active position, the lock (**30**) moves from its second to its first position so as to release the latch (**10**) and the ejector guide (**40**) passes from its set position to its rest position so as to eject the latch (**10**) released from the base (**20**) and, in a second mode, when a force tending to open the locked buckle is equal to or exceeds this given value, the actuating button (**50**) is unable to pass from its inactive position to its active position so as to dislodge the latch (**30**) from its third position, cause it to pass through its second position and reach its first position.

4,928,367

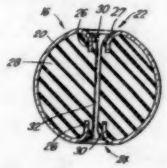
EARRING CLUTCH

Sheldon Seidman, Brooklyn, N.Y., assignor to Automatic Findings, Inc., Brooklyn, N.Y.

Division of Ser. No. 154,918, Feb. 11, 1988, Pat. No. 4,843,699. This application Feb. 6, 1989, Ser. No. 306,696

Int. Cl.[5] A44C 7/00

U.S. Cl. 24—705 9 Claims



1. An earring clutch comprising a body portion having a hollow shell filled with an elastomer material, said body portion being formed with at least one aperture communicating with an interior of said elastomer material and having a bore in said elastomer material extending from said aperture into the interior of said elastomer material for receiving and releasably frictionally retaining a post portion of the earring, and further comprising at least one flange formed on said shell and defining said aperture, said flange being annularly continuous about an axis of said bore and projecting inwardly of said shell into said interior so that a portion of said elastomer material is located between an inner wall of said flange and said bore thereby covering both sides of said flange in said elastomer material.

4,928,368

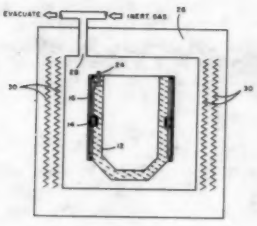
METHOD OF DIFFUSION BONDING COPPER AND TITANIUM ALLOYS TO PRODUCE A PROJECTILE

Jacob Greenspan, Newton, Mass., and Gasper J. Sacco, Succasunna, N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 7, 1989, Ser. No. 320,242

Int. Cl.[5] B21K 21/06

U.S. Cl. 29—1.22 6 Claims



1. A method of diffusion bonding copper and titanium alloy comprising the steps of:

a. providing a copper workpiece and a titanium alloy workpiece to be joined;

b. forming a mating surface between said workpieces;

c. juxtaposing said workpieces at said surface;

d. providing an additional plate of titanium and welding said plate over said copper workpiece and said alloy workpiece to create an assembly having a sealed space between said plate and said alloy workpiece, said plate being in contact with said copper workpiece;

e. evacuating and sealing said space;

f. providing an antoclave chamber and placing said assembly in said chamber;

g. pressurizing said chamber at a selected pressure with an inert gas;

h. heating said chamber at a selected temperature for a selected dwell time;

i. air cooling said chamber;

j. removing said assembly from said chamber and removing said plate from said assembly.

4,928,369

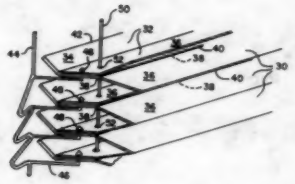
METHOD OF MAKING A PLEATED BLIND WITH ARTICULATIVE SLAT EXTENSIONS

John Schnebly, Albany, and Thomas J. Marusak, Loudonville, both of N.Y., assignors to Comfortex Corporation, Cohoes, N.Y.

Continuation of Ser. No. 209,090, Jun. 20, 1988, Pat. No. 4,884,612. This application Jun. 7, 1989, Ser. No. 362,566

Int. Cl.[5] A47H 5/00; B23P 19/04

U.S. Cl. 29—24.5 7 Claims



1. The method of making a pleated blind having hingably attached to pleat troughs thereof a plurality of slats, said method comprising demarcating on a sheet of shading material transverse lines of fold and areas to receive adhesive-stiffener coating, applying said adhesive-stiffener, and folding said sheet along a first set of said lines to acquire expandable pleats in non-adhesive areas and along a second set of lines to acquire cojoined adhesively bound pleat-trough extensions in and about one-half the width of the adhesive areas.

4,928,370

TOOL SET FOR CONNECTING SUPERPOSED SHEET METAL WORK PIECES

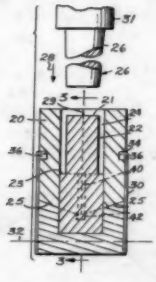
Gerd-Jurgen Eckold, Silberhutte 11, 3424 St. Andreasberg, and Hans Maass, Germelmannstra. 12, 3422 Bad Lauterberg, both of Fed. Rep. of Germany

Filed Mar. 17, 1989, Ser. No. 324,825

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1988, 8803773

Int. Cl.[5] B23P 19/00

U.S. Cl. 29—243.5 16 Claims



1. A tool set to be mounted in and to be driven by a press for

connecting a plurality of superposed sheet metal work pieces of predetermined thickness by forming a joint therebetween, said tool set comprising:

a punch member having a substantially flat end face, and

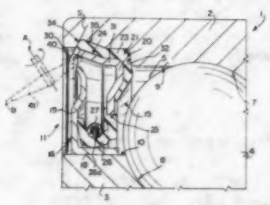
a die comprising an anvil having a substantially flat end face mounted opposite said punch end face and a forming member surrounding said anvil, thereby defining the sides and a bottom of a die cavity, said forming member being spaced a predetermined distance from at least a portion of said anvil so as to define a gap therebetween which opens toward said anvil face so that upon press actuation metal material can be deformed into said die cavity and said gap, said gap being present when said die is not in use and said gap encompassing the entire circumference of said anvil, said gap being dimensioned so that it is deeper than necessary to form the joint and so said metal material cannot fill said gap, said die including means for supporting said forming member in a stationary manner relative to said anvil during said deformation.

4,928,371

METHOD OF MAKING A SEAL FOR BEARING ASSEMBLY

Franco Colanzi, and Angelo Vignotto, both of Turin, Italy, assignors to RIV-SKF Officine di Villar Perosa S.p.A., Turin, Italy

Filed Dec. 2, 1988, Ser. No. 278,846
Claims priority, application Italy, Dec. 23, 1987, 68114 A/87
Int. Cl.[5] B21D *53/10*
U.S. Cl. 29—898.064 **2 Claims**



1. Method for producing a sealed rolling bearing assembly including inner and outer rings and a plurality of rolling elements in an annular space between the rings and a rim consisting of the steps of:

a. producing one of the rings with a circumferentially extending seat having a radially directed shoulder (**32**) spaced inwardly from one axial end face of the ring and with a stepped throat area (**31**) between the axial end face and the shoulder, the throat area being defined by a conical lateral wall segment (**34**), and a frusto conical outwardly directed tapered wall segment (**35**);

b. inserting a sealing element comprising a shield member of relatively rigid and plastically deformable material and an elastomeric material completely covering the outer periphery of the shield member, the seal being prior to installation of an inverted L-shaped cross section by an axially extending rim section and a radial section;

c. inserting the seal into the annular space between the rings so that the radial section abuts the shoulder (**32**);

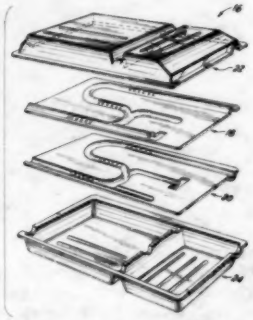
d. and applying a radially outwardly directed sealing force on the axially extending rim section of the seal so that the elastomeric material covering fills the entire throat area and is pinched between the wall segments (**34, 35**), and the seal is seated firmly in place in the throat area.

4,928,372

PROCESS FOR MANUFACTURING STAMP FORMED MUFFLERS

Jon W. Harwood, Toledo, Ohio; Wayne A. Karlgaard, Dyersburg, Tenn., and Michael W. Clegg, Toledo, Ohio, assignors to AP Parts Manufacturing Company, Toledo, Ohio

Filed Apr. 7, 1989, Ser. No. 335,120
Int. Cl.[5] B21K *29/00*
U.S. Cl. 29—890.08 **24 Claims**



1. A process for manufacturing exhaust mufflers, each of said mufflers comprising first and second plates having peripheries, at least one of said plates having an array of channels therein, said muffler further comprising at least one external shell having a peripheral flange and at least one chamber extending from the peripheral flange, said process comprising the steps of:

fixturing said plates in opposed face-to-face aligned relationship such that one plate and the array of channels in the opposed plate define an array of tubes;

securely gripping the plates in aligned relationship;

connecting said plates at a plurality of spaced locations on opposed sides of the channels formed in the plates;

presenting said external shell and the plates to a second fixturing apparatus for disposing the peripheries of the plates and the peripheral flange of the shell in register with one another;

securely urging the peripheries of the plates and the peripheral flange of the shell into direct abutting face-to-face contact;

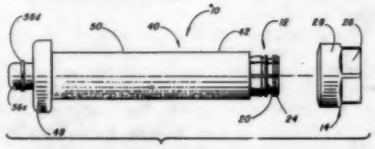
securely connecting the peripheries of the plates and the peripheral flange of the shell to one another.

4,928,373

COLLET TOOL

Ted R. Massa, Latrobe, and David R. Siddle, Greensburg, both of Pa., assignors to Kennametal Inc., Latrobe, Pa.

Filed Jul. 17, 1989, Ser. No. 380,822
Int. Cl.[5] B25B *27/14*
U.S. Cl. 29—278 **10 Claims**



1. A tool for handling a collet of the type having a forward end portion adapted to be confined within a retainer and a tapered rear end portion where the outside diameter becomes

progressively smaller toward the rear end of the collet, said tool comprising:

(a) an elongated sleeve having a collet receiving end section having a collet receiving area including a tapered inlet adapted to be extended over the tapered rear end portion of the collet such that as the sleeve is pushed over the rear end portion of the collet toward the front end portion the collet compresses radially to such a degree that the collet is lodged within the receiving end of the sleeve and the collet is freely removable from the retainer;

(b) a collet ejector reciprocally mounted in the sleeve;

(c) the collet ejector including an elongated plunger having a collet engaging end disposed within the sleeve and an actuator end that extends from the end of the sleeve opposite the collet receiving end; and

(d) wherein the plunger is movably mounted within the sleeve for movement between a retracted position and an extended position wherein in moving from the retracted position to the extended position the plunger is operative to engage and dislodge the collet from the receiving end of a sleeve.

4,928,374

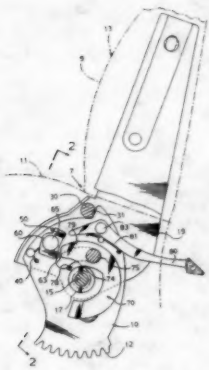
METHOD OF VEHICLE SEAT LATCH

John J. Allen, Cambridge, Md., assignor to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 200,339, Jun. 1, 1988, Pat. No. 4,846,526. This application Apr. 24, 1989, Ser. No. 342,050

Int. Cl.[5] B23P *11/00*

U.S. Cl. 29—436 **1 Claim**



1. A method of pivotally connecting a seat back with a seat cushion along a first pivotal axis allowing the seat back to have free pivotal movement forward under low angular accelerations and to restrain pivotal movement of the seat back forward under high angular accelerations, said method in combination comprising:

pivotally connecting said seat back with said seat cushion along said first pivotal axis;

connecting with said seat cushion a first stop fixed with respect to said seat back;

connecting with said seat back a second pivot pin along a second pivotal axis;

pivotally mounting with respect to said seat cushion a slip block along a third pivot pin said third pivot pin being fixed with respect to said seat back;

angularly biasing said slip block against a second angular stop generally fixed with respect to said seat back; and

pivotally connecting on said second pivot pin a pendulum;

contacting said slip block with said pendulum in a direction pivoting said slip block away from said second angular stop when said seat back is pivotally moved forward under low acceleration whereby allowing said seat back to further pivot forward; and

exposing said pendulum to a rearward acceleration of a predetermined value and pivoting said pendulum on said second pivot pin to contact said slip block to pivot in an angular direction towards said second angular stop whereby limiting the forward pivotal travel of said seat back when said seat back has pivotal movement forward under a high angular acceleration.

4,928,375

METHOD OF FORMING A HOLLOW FASTENER FROM SHEET METAL

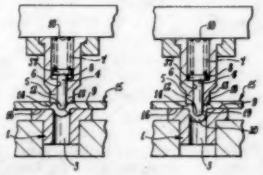
Bernard M. Hadaway, 10 Highland Avenue, Highett, Victoria, Australia (3190)

Continuation of Ser. No. 86,177, Aug. 13, 1987, abandoned, which is a continuation of Ser. No. 785,610, Oct. 8, 1985, abandoned. This application Sep. 26, 1988, Ser. No. 249,192

Claims priority, application Australia, Oct. 11, 1984, PG7593

Int. Cl.[5] B21D *39/00*; B23P *11/00*

U.S. Cl. 29—509 **15 Claims**



1. A method of forming a hollow fastener from metal sheet including the steps of: placing the metal sheet between two dies, one of which has a cavity therein and the other has a plunger connected thereto, said plunger being axially movable relative to the respective said die and being receivable in said cavity with clearance such that an annular space is defined between said plunger and said cavity; causing said plunger to engage a portion of said sheet which overlies said cavity and which is to form an end of said fastener; subjecting said plunger to a bias force so as to urge it towards said cavity and thereby apply pressure against said sheet portion, said pressure being sufficient to apply plastic and elastic stresses to cause said sheet portion to distort and protrude into said cavity but being insufficient to cause said plunger to break through said metal sheet, and to thereby introduce predominant tensile forces into said sheet portion and the immediately surrounding portion of said sheet; closing said dies while maintaining said pressure on the distorted sheet portion and thereby compressing an annular portion of said sheet which surrounds said cavity so as to cause metal to be displaced from that annular portion; and maintaining said bias force on the plunger during said compression so that the pressure thereby applied to said distorted portion causes said displaced metal to be directed to flow and be drawn into the mouth of said cavity and be formed around said plunger under the influence of said predominant tensile forces, and to cause the plunger to move into said cavity while continuing to engage and press against said fastener end, whereby the metal which is displaced flows and is drawn into said cavity through said space to form a constant thickness cylindrical tubular portion between said annular portion and said fastener end and tension is maintained in said tubular portion as it is being formed.

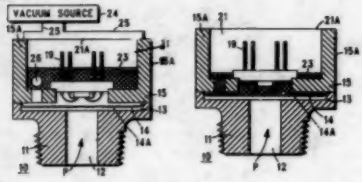
8. A method of securing two sheets in face to face relationship, at least one of which is metal sheet, including the steps of forming at least one hollow fastener on said metal sheet in accordance with the method of claim 1, forming a hole in the other said sheet to receive said fastener, placing said sheets in face to face engagement with said fastener projecting through said hole, and mechanically deforming the terminal end of said fastener so as to secure said sheets together.

4,928,376

METHOD FOR FILLING A CAVITY, SUCH AS A SENSOR CAVITY, WITH AN INCOMPRESSIBLE FLUID

Lawrence R. Poglitsch, Mt. Prospect, Ill., assignor to Motorola Inc., Schaumburg, Ill.

Filed Jul. 31, 1989, Ser. No. 387,563
Int. Cl.[5] B23P *19/04*; B65B *3/04*
U.S. Cl. 29—530 24 Claims



1. A method for filling a sensor cavity with an incompressible fluid comprising the steps of:

providing an external cavity of a sensor fixed to and adjacent to an internal sensor cavity associated with a sensor element, said internal cavity being sealed except for an opening connecting it to said external cavity;

providing a predetermined amount of incompressible fluid in said external cavity;

evacuating gas from said external and internal cavities after said fluid is provided in said external cavity and thereby providing at least a partial vacuum in said internal cavity;

subsequently releasing vacuum pressure on said external cavity such that said fluid is drawn into said internal sensor cavity through said opening from said external cavity; and

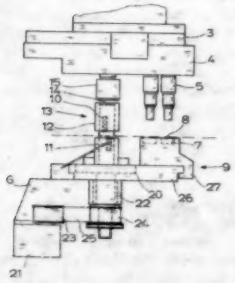
subsequently sealing said opening and thereby isolating said external and internal cavities and sealing said internal sensor cavity, whereby said internal sensor cavity is sealed after being filled with said incompressible fluid.

4,928,377

MACHINE TOOL

Karl-Heinz Schulte, Lennestadt, Fed. Rep. of Germany, assignor to Muhr und Bender Maschinenbau GmbH, Attendorn, Fed. Rep. of Germany

Filed Oct. 19, 1989, Ser. No. 424,031
Claims priority, application Fed. Rep. of Germany, Nov. 8, 1988, 3838198
Int. Cl.[5] B23P *23/00*; B21D *43/00*; B26D *9/00*
U.S. Cl. 29—560 18 Claims



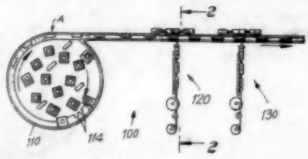
1. A machine tool having a machine frame open on three sides, in approximately the shape of the letter C, comprising, an upper die support disposed on the machine frame and vertically movable by a drive cradle, at least two die holding fixtures placed side by side and having corresponding upper dies, a lower die support disposed on said machine frame with a corresponding number of die holding fixtures placed side by side and having corresponding lower dies, and a matrix plate placed on the lower die support, disposed in a frame and containing the die holding fixtures, wherein instead of a lower die a tool unit, comprising an upper die and a lower die in a guide frame, cutting unit or coping unit, is disposed in a corresponding die holding fixture on the matrix plate and is drivingly connected with the upper die support.

4,928,378

APPARATUS FOR MAKING PLASTIC LEADED CHIP CARRIER CONNECTORS

Donald A. Smith; William H. Carter, both of Union City; Howard E. Dingfelder, Corry; Dale L. Burgess, Union City, and Alan B. Gates, Corry, all of Pa., assignors to Barnes Group Inc., Bristol, Conn.

Division of Ser. No. 230,810, Aug. 10, 1988, Pat. No. 4,879,808.
This application Sep. 5, 1989, Ser. No. 383,464
Int. Cl.[5] H01R *43/00*
U.S. Cl. 29—564.6 24 Claims



1. An apparatus for making a plastic leaded chip carrier connector comprising:

means for aligning a base having a plurality of apertures with a wire feed device;

means for advancing one end of a wire from said wire feed device from one side of said base and through a first aperture therein and such that said wire end extends from said base;

means for forming a predetermined configuration of the wire at said end which has passed through the aperture of said base;

means for retracting said formed wire end into said aperture so that said predetermined configuration lockingly engages said wire end with said aperture; and

means for cutting said wire end so that said wire end forms a pin locked in said first aperture for conducting electrical information through said base.

4,928,379

PRESS FOR USE IN ALIGNING AND TERMINATING FLAT CABLE

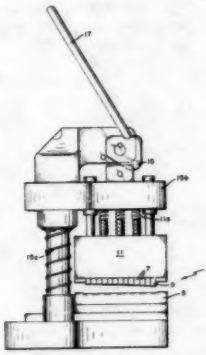
Patrick J. Paquin, Hamden, and Robert L. Baran, Plymouth, both of Conn., assignors to Amphenol Corporation, Wallingford, Conn.

Filed Apr. 24, 1986, Ser. No. 855,253
Int. Cl.[5] H01R *43/01*
U.S. Cl. 29—566.3 4 Claims

1. A cable terminating press for terminating flat cable of the type having multiple individual conductors extending therethrough, said press comprising:

locating and clamp means having at least two clamp portions, at least one clamp portion being individually operable for first positioning and clamping a first predetermined portion of said cable in a manner wherein the conductors within said portion are clamped in a desired position, and for subsequently selectively clamping additional predetermined portions of said cable with conductors thereof in desired positions;

cable cutting means located relative to said locating and clamp means for substantially uniformly cutting off the end of the cable to permit subsequent termination in a connector, said cable cutting means comprising an upwardly spring braced blade moveable between a first cutting position for cutting cable and a second non-cutting



position for permitting said press means to terminate the cable with a connector; and

press means for supporting a flat cable connector in open engagement with the cut end of the cable and for pressing closed said connector onto the cut end of the cable whereby the cable is terminated.

4,928,380

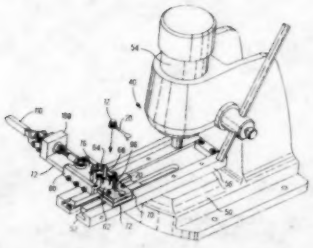
APPARATUS FOR TERMINATING A CABLE TO A TWO PART CIRCULAR CONNECTOR

John G. Hatfield, Camp Hill, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Dec. 20, 1989, Ser. No. 453,439

Int. Cl.[5] H01R *43/00*

U.S. Cl. 29—566.3 **12 Claims**



1. An apparatus for terminating a plurality of conductors of a cable to insulation displacement terminals of a two part circular connector and assembly thereof, said connector including a wire hub part having a plurality of radial hub slots on a given angular spacing and a contact housing part having a plurality of insulation displacement terminals on said given angular spacing and having a one to one correspondence with said radial hub slots, the apparatus comprising:

(a) a die with an inner cylindrical surface having a major axis, said inner cylindrical surface terminating in a seat for receiving and positioning both said wire hub part and said contact housing part in mutual alignment along said major axis, said die including a plurality of radial die slots intersecting said inner cylindrical surface on said given angular spacing for receiving said plurality of conductors; and

(b) a punch having an outer cylindrical surface arranged concentric with said inner cylindrical surface for reciprocating movement along said major axis into and out of engagement with said die, said punch including means for engaging said contact housing part and moving it along said major axis into mating engagement with said wire hub part and means for severing said conductors to length, so that when said plurality of conductors are arranged one conductor in each radial hub slot and extending into said radial die slot adjacent thereto, said conductors are severed to length and each said conductor positioned in a radial wire hub slot is terminated to a respective insulation displacement terminal.

4,928,381

AUTOMATIC TOOL CHANGER

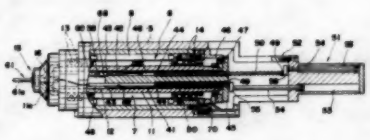
Yoshinori Yaguchi; Masahiro Kubota, and Masamitsu Nakaminami, all of Yamatokoriyamashi, Japan, assignors to Kabushiki Kaisha Mori Seiki Seisikusho, Japan

Filed Apr. 14, 1989, Ser. No. 338,221

Claims priority, application Japan, Apr. 15, 1988, 63-93867; Sep. 12, 1988, 63-228092

Int. Cl.[5] B23Q *3/157*

U.S. Cl. 29—568 **10 Claims**



1. An automatic tool changer for exchanging one tool with another, the automatic tool changer comprising:

a main spindle having an internal bore;

a chuck provided at an opening of the main spindle;

a plurality of tools accommodated in the internal bore of the main spindle, wherein the tools are individually slidable axially of the main spindle: and

means for pulling the tools out of the chuck and pushing the tools toward the opening of the main spindle, thereby replacing a first tool on the chuck with a second tool accommodated in the bore of the main spindle.

4,928,382

METHOD OF THE PRODUCTION OF A MAGNETIC HEAD

Hideo Fujiwara, Ibaragi; Takeshi Tottori, Toride; Osamu Inagoya, and Hirosuke Mikami, both of Ibaragi, all of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan

Continuation of Ser. No. 899,083, Aug. 22, 1986, abandoned. This application Jan. 9, 1989, Ser. No. 296,368

Claims priority, application Japan, Aug. 23, 1985, 60-183833

Int. Cl.[5] G11B *5/127*

U.S. Cl. 29—603 **13 Claims**

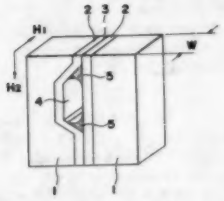
1. A method in the production of a magnetic head having a magnetic circuit, at least one part of the circuit being formed of a magnetic head core of magnetic material of a predetermined width in which anisotropy can be induced, comprising:

providing a magnetic head which comprises a core material including substrates which each have a magnetic thin layer of magnetic material formed on opposing surfaces thereof, said magnetic thin layers each having a thickness of from 1–100 μm, and a head gap film formed between said magnetic thin layers;

annealing said magnetic head in a first annealing process at a first temperature under a first magnetic field of a first intensity for inducing one axis of easy magnetization in a

part of the magnetic material in said magnetic head, the direction of said magnetic field during said first annealing process coinciding with the width direction of said head gap film along a first surface of said head core; and

annealing said magnetic head in a second annealing process at a second temperature under a second magnetic field of a second intensity following said first annealing process, the direction of said second magnetic field during said second annealing process coinciding with the depth direction of said head gap film and being perpendicular to the direction of said first magnetic field and to said one axis of easy magnetization along a second surface of said head core such that a magnetic anisotropy generated by said first annealing process is relaxed by said second annealing process whereby the permeability of said magnetic material is increased to improved the magnetic characteristics of said magnetic head, said annealing temperature being higher than 200° C.

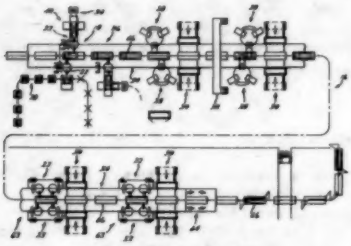


4,928,383

NON-SYNCHRONOUS ASSEMBLY SYSTEM

James S. Kaczmarek, Northville, and Kenneth C. Kareta, Mount Clemens, both of Mich., assignors to Permaflex Company, Detroit, Mich.

Filed Oct. 18, 1988, Ser. No. 259,216
Int. Cl.[5] B23P *24/00*
U.S. Cl. 29—711 **27 Claims**



1. A production line for performing a series of different operations on a variety of workpieces in seriatim, the line comprising:

a plurality of successive work stations each containing at least one machine for performing one of said operations on said workpieces, at least one of said work stations containing at least one machine, wherein said machine performs at least one operation from at least two of said series of different operations;

transport means for carrying said workpieces through said succession of work stations, said transport means being selectively operable to move every said workpiece on said line simultaneously or to move any select number of said workpieces on said line asynchronously; and

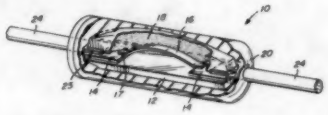
means for orienting and holding each said workpiece at the respective work stations.

4,928,384

METHOD OF MAKING A WIRE BONDED MICROFUSE

Leon Gurevich, St. Louis, Mo., assignor to Cooper Industries, Inc., Houston, Tex.

Continuation of Ser. No. 148,263, Jan. 28, 1988, abandoned, which is a division of Ser. No. 29,831, Mar. 24, 1987, Pat. No. 4,771,260. This application Oct. 6, 1989, Ser. No. 417,930
Int. Cl.[5] H01H *69/02*
U.S. Cl. 29—623 **38 Claims**



1. A method of making a fuse element subassembly comprising the steps of:

providing a substrate of insulating material;

producing two separate metallized areas on the substrate;

bonding one end of a fusible element to one of the separate metallized areas without using solder or flux;

extending the fusible element across the substrate to the other of the separate metallized areas;

bonding the other end of the fusible element to the other separate metallized area to electrically connect the metallized areas on the substrate; and

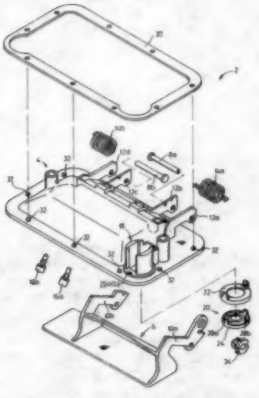
attaching a lead to each one of the separate metallized areas without causing the lead to contact the fusible element.

4,928,385

AUTOMOTIVE DOOR HANDLE ASSEMBLING ROBOT

Hiroyuki Noguchi, and Ichiho Yamada, both of Marysville, Ohio, assignors to Honda Giken Kogyo, Tokyo, Japan

Filed Apr. 6, 1989, Ser. No. 333,907
Int. Cl.[5] B23P *21/00*
U.S. Cl. 29—788 **9 Claims**



1. An apparatus for assembling a door handle by installing a key guard assembly in the door handle in automatically assembling the door handle assembly to be mounted on the outer surface of an automotive door panel, said apparatus comprising:

first feed means for feeding components of the key guard assembly supplied from a parts feeder;

superposing means for superposing the components of the key guard assembly supplied by said first feed means, into a key guard assembly;

an industrial robot for installing the key guard assembly in a door handle and;

second feed means for delivering the key guard assembly to said industrial robot;

said industrial robot comprising chuck means for gripping said key guard assembly and installing the key guard assembly in the door handle, and an end effector having staking means for bending tongues of said key guard assembly to fix the key guard assembly to the door handle.

4,928,386

MOUNTING ARRANGEMENT FOR THE AUTOMATIC ASSEMBLY OF AGGREGATES PREFABRICATED PARTS TO A CAR BODY FROM BELOW

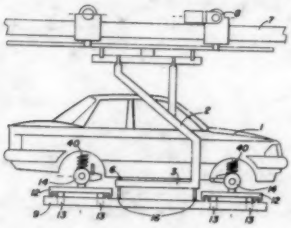
Gerhard Schupp; Klaus Tscheschlok, both of Friedberg, and Maischberger Johann, Dinkelscherben, all of Fed. Rep. of Germany, assignors to KUKA Schweissanlagen and Roboter GmbH, Augsburg, Fed. Rep. of Germany

Filed Mar. 28, 1989, Ser. No. 329,582

Claims priority, application Fed. Rep. of Germany, Mar. 31, 1988, 38011107

Int. Cl.[5] B23P *19/04*

U.S. Cl. 29—824 **8 Claims**



1. An automatic mounting device for assembling prefabricated parts to a car body, comprising:

suspension means for carrying a car body from a first location to a centered location at an assembly station;

a mounting frame positioned at the assembly station, said mounting frame carrying installation plates arranged substantially in parallel with respect to each other, said installation plates being slidable with respect to the mounting frame, said mounting frame being adjustable to move against a bottom part of the car body, said installation plates being liftable from a first precentered position with respect to the mounting frame, to a second floating position allowing limited floating movement with respect to the mounting frame, the prefabricated parts being arranged on the installation plates;

a vertical centering journal connected to each installation plate, the prefabricated parts having alignment bores for receiving the corresponding vertical centering journal, each said vertical centering journal protruding beyond the corresponding alignment bore;

centering bores formed at a bottom part of the car body for receiving the portion of the vertical centering journal protruding beyond the corresponding alignment bore, the prefabricated parts being automatically aligned in an assembly position by means of the floating movement of the installation plates upon movement of the mounting frame toward the car body.

4,928,387

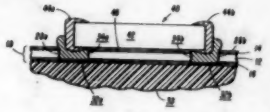
TEMPORARY SOLDERING AID FOR MANUFACTURE OF PRINTED WIRING ASSEMBLIES

John C. Mather, and Jerald A. Young, both of Cedar Rapids, Iowa, assignors to Rockwell International Corp., El Segundo, Calif.

Filed Sep. 7, 1989, Ser. No. 404,233

Int. Cl.[5] H05K *3/34*

U.S. Cl. 29—840 **5 Claims**



1. Method of attaching a surface mount component to a printed wiring board having a multiplicity of solder pads positioned thereon to receive the terminations on the component, comprising the steps of:

providing a mask blank coextensive with the printed wiring board, comprising a base layer material coated on both top and a bottom sides with an adhesive layer and protected by a coextensive backing on both top and bottom sides thereof, the combined thickness of the base layer and the adhesive layers being equal to desired standoff distance between said printed wiring board and said component;

selectively forming openings through the mask blank, sized and positioned to correspond to the locations of selected ones of the solder pads;

removing said backing from the bottom side of said mask blank to expose the underlying bottom adhesive layer;

applying said mask blank with said exposed adhesive layer to said printed wiring board, positioned with the openings therein in registry with said solder pads;

filling said holes with solder paste;

removing said backing from the top side of said mask blank to expose the top underlying adhesive layer;

positioning said surface mount component onto said exposed top adhesive layer with its terminations over said paste filled holes to form a printed wiring board assembly;

heating said printed wiring board assembly to melt said solder paste into a solder mass; and

cooling said printed wiring board assembly to solidify said solder mass.

4,928,388

SINGLE STATION HEMMING TOOLING

Ernest A. Dacey, Jr., Sterling Heights, Mich., assignor to Utica Enterprises, Inc., Sterling Heights, Mich.

Division of Ser. No. 891,292, Jul. 31, 1986, Pat. No. 4,827,595, which is a continuation-in-part of Ser. No. 805,893, Dec. 5, 1985, Pat. No. 4,706,489. This application Mar. 1, 1989, Ser. No. 317,834

Int. Cl.[5] B23P *11/00*

U.S. Cl. 29—798 **3 Claims**

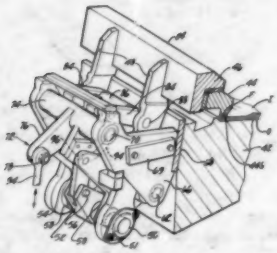
1. Apparatus for hemming an upstanding flange at the periphery of an outer piece to overlie the periphery of an inner piece which overlies said outer piece to thereby join said outer piece and for piercing a tab extending from said flange and an adjacent surface of a portion of said inner piece to thereby at least partially interlock said outer piece and said inner piece, said apparatus comprising:

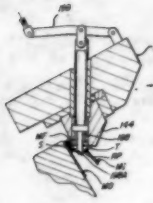
a tool element having a first contact surface and a second contact surface contiguous to said first contact surface, said first contact surface engaging said upstanding flange at the periphery of said outer piece to partially fold said upstanding flange over said periphery of said inner piece, said second contact surface engaging said partially folded upstanding flange to completely fold over said upstanding

flange of said outer piece over said periphery of said inner piece such as to complete the hemming of said flange;

a piercing tool integrally mounted with said tool element for movement therewith, said piercing tool being reciprocable within said tool element;

means for moving said tool element in a first arcuate motion towards said upstanding flange to engage said upstanding flange of said outer piece and to partially fold said upstanding flange of said outer piece over the periphery of





said inner piece, said means for moving said tool element further comprising means for completely folding over and joining said outer piece to said inner piece such that said folded over flange of said outer piece is in intimate contact with said inner piece; and

means for reciprocating said piercing tool within said tool element, said reciprocating means moving said piercing tool to pierce said tab in said folded over flange of said outer piece and said periphery of said inner piece to interlock said outer piece and said inner piece.

4,928,389

SHAVING HEAD FOR A DRY-SHAVING APPARATUS

Harald Melwisch, Klagenfurt, and Norbert Schneider, Ebental, both of, assignors to U.S. Philips Corp., New York, N.Y.

Filed Sep. 29, 1987, Ser. No. 103,079

Claims priority, application Austria, Oct. 3, 1986, 2629/86

Int. Cl.[5] B26B *19/02*

U.S. Cl. 30—43.92 **9 Claims**

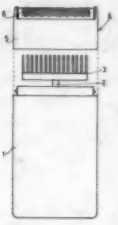
1. A shaving head for a dry-shaving apparatus which comprises:

a shaving-head frame which comprises two longitudinal members, two side walls and slots with open ends formed in the side walls;

an arcuate shear foil detachably secured to said shaving-head frame, said foil having longitudinal edges and comprising at both ends of at least one of its longitudinal edges projections which are insertable into the open ends of the shaving-head frame slots during mounting of the shear foil on the shaving-head frame; and

at least one raised portion for securing the shear foil to the shaving-head frame and which is carried by one of said longitudinal members of the shaving-head frame adjacent a longitudinal edge of the shear foil and at a distance from said slots, wherein:

said raised portion comprises a first ramp which is upwardly inclined in the direction of insertion, which ramp projects



from the shaving-head frame and engages beneath a longitudinal edge of the shear foil; and wherein said raised portion also comprises a second ramp which is downwardly inclined in the direction of insertion and which substantially adjoins said first ramp.

4,928,390

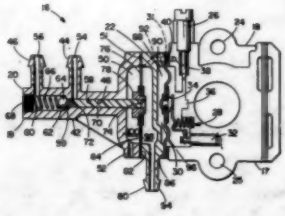
CARBURETOR AND OIL PUMP ASSEMBLY AND METHOD OF MAKING THE SAME

James R. Gassen, and Lakhbir S. Suchdev, both of Charlotte, N.C., assignors to Textron, Inc., Providence, R.I.

Filed Aug. 22, 1989, Ser. No. 397,047

Int. Cl.[5] B23D *59/04;* **B27B** *17/02;* **F02B** *33/04*

U.S. Cl. 30—123.4 **18 Claims**



1. A chain saw having an engine with a crankcase, a saw chain, and a carburetor and saw chain oiler assembly, said assembly comprising:

first frame means having an oil inlet, an oil outlet, a first conduit means connecting said inlet and said outlet, and a first recess;

piston means having a piston member at least partially positioned in said first conduit means and adapted for reciprocal movement therein;

an oil pump diaphragm connected to said first frame means and said piston member proximate said first recess;

carburetor means having a carburetor housing and a carburetor fuel diaphragm; and

second frame means having a first side with a second recess, a second side with a third recess and a first gas conduit means between said second recess and said second side adapted for communication with a gas conduit in said carburetor housing extending from said crankcase, said second side being mounted to said carburetor housing with said third recess adapted to allow said fuel diaphragm of said carburetor relatively free movement, said first frame means being mounted to said second frame means with said first and second recesses forming a diaphragm movement area for said oil pump diaphragm with

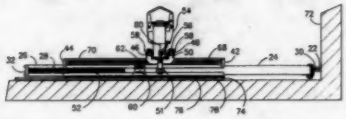
a working chamber formed by said second recess and said oil diaphragm such that gas pressure pulses from said crankcase can be supplied to said second recess to move said oil pump diaphragm for moving said piston member to pump oil from said inlet to said outlet for oiling said saw chain whereby the carburetor and chain oiler assembly has a relatively small size, relatively light weight and a relatively few number of parts.

4,928,391

CARPET TILE CUTTING MACHINE

Kenneth B. Higgins, LaGrange, Ga., and Walter Engels, Tryon, N.C., assignors to Milliken Research Corporation, Spartanburg, S.C.

Filed Mar. 31, 1989, Ser. No. 331,165
Int. Cl.[5] B26B *29/00*
U.S. Cl. 30—293 **14 Claims**



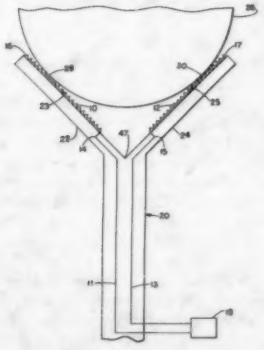
1. Apparatus to cut carpet tiles accurately for placement in an area smaller than a standard carpet tile comprising: a pair of tubular members spaced from one another, a first means interconnecting said tubular members at one end, a second means pivotally connected to each of tubular members at the other end, each of tubular members having a first fixed tube and a second tube slidably mounted in said first fixed tube, biasing means in each of said tubular members biasing said second tube outwardly from said first fixed tube, a wall abutment means mounted on said second means and a cutter means operably associated with each of said second tubes substantially parallel to said second means to cut carpet tiles thereunder when said second tube is slid in said fixed tube when said wall abutment means is forced against a wall member.

4,928,392

DIAMETER GAUGE

Charles W. Donaldson, Fairfield, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed Feb. 16, 1988, Ser. No. 156,507
Int. Cl.[5] G01B *7/12*
U.S. Cl. 33—178 E **9 Claims**



1. Apparatus for measuring an outside diameter of a part having a circular cross section comprising:

first and second arms affixed to a common support, said arms including a pair of mutually facing, planar reference surfaces converging at a right angle to define a line of intersection, wherein at least one of said reference surfaces includes a linear groove perpendicular to said line of intersection;

at least one contact surface associated with each of said reference surfaces, each of said contact surfaces being oriented to make contact at least at a point of tangency with said part when said part is positioned between said arms for a diameter measurement;

an elongated resistor element disposed in said groove having a resistance that varies linearly with its length;

a flexible conductor element having negligible resistance and including one of said contact surfaces, said conductor element being coextensive in length with said resistor element and being positioned parallel thereto;

resiliently compressible spacer means mutually spaced to flank said resistor element; said spacer means normally maintaining said conductor element out of contact with said resistor element;

said conductor element being responsive to pressure on its contact surface by said part to compress said spacer elements until electrical contact with said resistor element is established;

means for measuring the resistance of that portion of the resistor element which is connected in series with said conductor element through said electrical contact; and

means for determining the diameter of said part as a function of the measured resistance.

4,928,393

LANE MARKER STEERING GUIDE

Wilbur B. Van Schaack, 4215 25th St. West, Bradenton, Fla. 33505

Continuation of Ser. No. 152,971, Feb. 8, 1988, Pat. No. 4,823,471. This application Apr. 20, 1989, Ser. No. 340,912
Int. Cl.[5] G01C *21/04*
U.S. Cl. 33—264 **2 Claims**

1. A lane marker steering guide releasably connectable to the inner surface of a windshield comprising:

a suction cup having a base with an inner surface attachable to the inside of the vehicle windshield;

said suction cup having an outer surface including a central raised portion laterally extending from said base;

an elongated sight member formed of flat, relatively thin, flexible material and having a proximal end, a distal end, and a mid-portion therebetween;

said sight member pivotally connected by a threaded fastener at said proximal end to said suction cup raised portion by threadable engagement of said threaded fastener into an aperture in said suction cup raised portion;

said sight member distal end arrow-shaped and terminating at a point in very close proximity radially outwardly from said base;

said sight member having a first and second transverse bend, said first transverse bend dividing said proximal end and said mid-portion, said second transverse bend dividing said distal end and said mid-portion;

said first bend positioned adjacent and in close proximity to said suction cup raised portion and disposing said mid-portion toward the windshield inner surface and said base outer edge margin;

said second bend positioned adjacent and in close proximity to said base outer edge margin and disposing and biasing said distal end generally parallel to and against the inner surface of the windshield;

said distal end opaque, the remainder of said sight member transparent;

said pivotal connection proximal end between said sight member and said suction cup raised portion frictionally adjustable by tightening and loosening said threaded fastener.

4,928,394

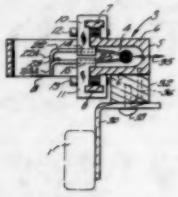
SIGHT FOR ARCHERY BOW

James R. Sherman, 2961 Rudo Rd., Urofino, Id. 83544

Filed Apr. 3, 1989, Ser. No. 331,833

Int. Cl.[5] **F41G** *1/46, 1/34*

U.S. Cl. 33—265 **5 Claims**



1. An archery bow sight comprising,

a base having parallel guides each defining a slot,

sight pin carriers adjustably mounted on said guides, said carriers of C-shape and including a clamping screw extending through said slot to clamp the carrier to the guide,

mounting means for coupling said base to the bow, and fiber optic means including at least one fiber optic having a first end carried by one of said sight pin carriers in the field of vision of an archer during aiming of the bow, said fiber optic having a remaining end for disposition toward a light source.

4,928,395

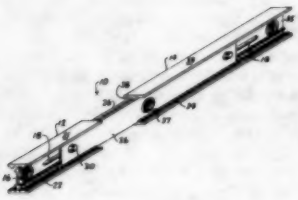
EXTENSIBLE LEVEL

Laverne C. Good, R.D. #4 Box 331B, Reading, Pa. 19606

Filed Jun. 6, 1989, Ser. No. 362,017

Int. Cl.[5] **G01C** *9/24*

U.S. Cl. 33—374 **9 Claims**



1. An extensible carpenter's level comprising:

at least a pair of body members, each said body member having a level means indicating at least one orientation angle of the level at a reference edge of said body member, said body members being related in an end-to-end arrangement such that reference edges of at least endmost ones of the body members are co-linear, said body members being I-shaped in cross section with a connecting portion and bottom and top base portions, said base portions having longitudinal extensions parallel to and forming top and bottom tracks with said connecting portion;

an extender mounted on said body members such that the body members are slidable along the extender, said extender being slideably retained in said top and a bottom opposing track of said body members, said extender mounted coextensively such that the body members are slidable along the extender in said tracks; and,

locking means on said extender and said pair of body members for locking the body members into relative portion on the extender.

4,928,396

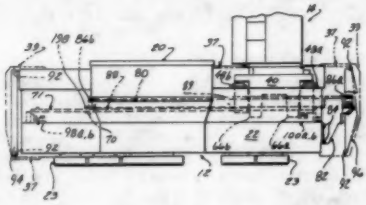
COORDINATE MEASURING MACHINE WITH IMPROVED CARRIAGE DRIVE SYSTEM

Freddie L. Raleigh, Centerville, Ohio, assignor to The Warner & Swasey Company, Cleveland, Ohio

Filed Mar. 7, 1989, Ser. No. 320,189

Int. Cl.[5] **G01B** *7/03, 5/03*

U.S. Cl. 33—503 **10 Claims**



1. In combination with a coordinate measuring machine (**10**) of the type having an improved carriage drive system, said coordinate measuring machine of the type including a base (**12**), a probe shaft (**16**) having a tip (**18**); mounting means mounting said probe (**16**) for movement along each of three orthogonal axes (X,Y,Z), said mounting means including: a carriage (**40**) supporting said probe (**16**) way surfaces (**32, 34**) extending along one (X) of said axes, supporting way bearing means (**46***a, b*; **48***a, b*) and guide bearing means (**72,74,76***a,b*; **78***a,b*) supporting and guiding said carriage (**40**) on said way surfaces (**32, 34**) for linear movement along said way surface (**32,34**), and a drive system for driving said carriage (**40**) along said one (X) axis, the improvement, wherein the drive for said carriage system comprises a drive system for said carriage (**40**) comprising:

an elongated rigid spar member (**88**), and means (**198, 152**) mounting said spar member (**88**) relative to said base (**12**) to extend along said one (X) axis adjacent to said way surfaces (**32, 34**), comprising a first means (**154, 152**) fixing one end of said spar member (**88**) to said base (**12**) and second means (**198, 200, 202**) positioning the other end of said spar member (**88**) laterally and vertically on said base (**12**) while not restraining said other end in a lengthwise direction whereby tension stress in said flexible belt (**89**) is not transmitted through said spar member (**88**) into said machine, nor stress caused by differential thermal expansion;

an elongated flexible belt (**89**); means (**86***a*, **86***b*) mounting said flexible belt (**89**) to be stretched along said one (X) axis, said means (**86***b*) attaching one end of said flexible belt (**89**) to one end of said spar member (**88**);

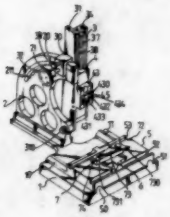
drive means (**118**) attached to said carriage (**40**) including a rotary drive member (**126**) engaging said flexible belt and means (**120**) for rotating said rotary drive member (**126**) to cause said carriage (**40**) to be advanced along said flexible belt (**89**) and said one (X) axis.

4,928,397

GOLF CLUB HEAD SURVEYING INSTRUMENT

Kuen-Yi Wang, No. 46, Lane 380, Chung San East Rd., Fong San, Kaohsiung Hsien, Taiwan

Filed Dec. 20, 1988, Ser. No. 286,813
Int. Cl.[5] G01B 5/24
U.S. Cl. 33—508 8 Claims



1. A golf club head surveying instrument for checking a head of any golf club, which comprises a bottom block having a quarter circle scale plate mounted thereon;

said bottom block having a balance block mounted thereon, a slide block removably and reversibly mounted on said balance block for supporting a rectangular block and for receiving a right-handed head and left-handed head of any golf club, said rectangular block having a trifurcate balance board for balance checking of a head of a golf club to be tested;

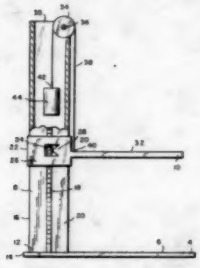
said quarter circle scale plate including an adjusting frame fixed thereto at its rear end, a V-shaped block mounted on said adjusting frame having a clamping element for holding said golf club, and an adjusting knob arranged for angular adjustment of adjusting frame.

4,928,398

ANTHROPOMETER

Michael Delfiner, 33 Harold St., Sharon, Mass. 02067

Filed Apr. 10, 1989, Ser. No. 335,765
Int. Cl.[5] G01B 5/00
U.S. Cl. 33—512 9 Claims



1. An anthropometer for determining the crotch height of a standing individual comprising:

support means including a fixed upright portion;

first measuring means depending from said upright portion including an upper surface adapted to bear against the crotch of said individual, said upper surface being freely moveable in the vertical direction; and

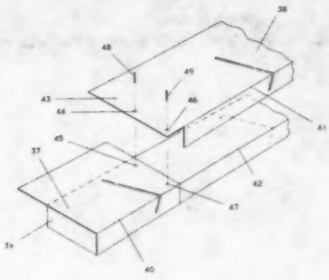
means for urging said upper surface upwardly with a predetermined force.

4,928,399

MARKING TEMPLATE

Gerald A. Kragt, Marne, Mich., assignor to Jer's Pattern Project, Inc., Marne, Mich.

Filed Feb. 9, 1989, Ser. No. 288,487
Int. Cl.[5] B43L 13/20
U.S. Cl. 33—562 6 Claims



1. A marking template including at least two elongated panel sections each having a fold line adjacent one edge, and an array of marking slots, having portions extending on both sides of said fold line in coplanar relationship, in the folded condition of said template, corresponding to cutting lines to be made on pieces of material, said sections, when folded 90 degrees along said fold lines, being adapted to engage an edge and an adjacent face of a piece of material of standard width and thickness, wherein the improvement comprises:

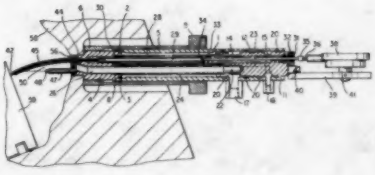
overlapping end portions on said sections, said portions having aligned holes when said sections are in longitudinal alignment in sequence.

4,928,400

BEARING CLEARANCE DETECTOR

David N. Schuh, 300, 1615 - 10th Avenue S.W., Calgary, Alberta, Canada (T3C 0J7)

Filed Jan. 19, 1988, Ser. No. 145,503
Int. Cl.[5] G01B 5/14
U.S. Cl. 33—605 7 Claims



1. A measuring device for use in detecting clearances in an engine cylinder comprising tubular casing means with closed ends for insertion into an engine cylinder; plunger means slidable in said casing means and extending beyond said closed ends of said casing means; probe means engaging one end of said plunger means for engaging a piston in the cylinder; spring means in said casing means for biasing said plunger means against said probe means, and consequently said probe means against the piston; a first fluid passageway communicating said engine cylinder with a source of fluid alternatively under pressure and vacuum, a second fluid passageway communicating said engine cylinder with a source of a lubricating fluid, and micrometer means on the other end of said casing means for engagement by said plunger means to provide an indication

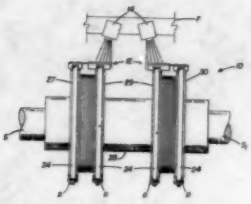
of piston movement in response to fluid pressure and vacuum in said first fluid passageway.

4,928,401

SHAFT ALIGNMENT SYSTEM

Malcolm G. Murray, Jr., 220 E. Texas Ave., Baytown, Tex. 77520

Filed Jan. 3, 1989, Ser. No. 292,923
Int. Cl.[5] G01B 5/25
U.S. Cl. 33—645 **10 Claims**



1. Apparatus for obtaining rotating alignment data for a driving/driven shaft with a coupling, comprising:

stroboscopic means for providing timed flashes of light;

scale means for determining cold and hot running alignment measurements; and

means for mounting said scale means to the shaft across said coupling so as to be stabilized for accurate hot running measurements;

said stroboscopic means being synchronized to the shaft speed in order to illuminate said scale means at various relative positions, whereby the desired shaft alignment data can be obtained;

said scale means including two relatively sliding scale components each including a base member for mounting.

4,928,402

FLUID FLOW APPARATUS AND PROCESS

Donavan J. Allen, Taylors, S.C., assignor to Torus Corporation, Greenville, S.C.

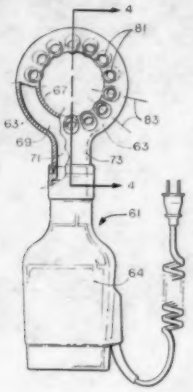
Division of Ser. No. 338,489, Apr. 13, 1989, which is a continuation of Ser. No. 157,053, Feb. 16, 1988, abandoned, which is a continuation-in-part of Ser. No. 124,051, Nov. 23, 1987, Pat. No. 4,836,702. This application May 9, 1989, Ser. No. 349,434
Int. Cl.[5] F26B 3/10
U.S. Cl. 34—97 **15 Claims**

1. An apparatus for drying hair comprising:

(a) a tubular body defining a fluid passageway therewithin and an opening therethrough;

(b) a plurality of nozzles located in a generally circular array about said opening and being in fluid communication with said passageway, said nozzles being adapted to focus fluid passing therethrough towards a common point away from said tubular body with fluid passing through said nozzles collectively following a conical pattern; and

(c) means for supplying fluid through said passageway and out of said nozzles at adequate pressure that upon striking a surface having hair thereon to be dried that is apart from said body but short of said common point, fluid will be



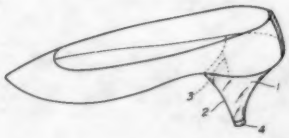
reflected rearwardly and pass through said opening while lifting hair being dried in the direction of said opening.

4,928,403

PLASTIC HEELS OF SHOES AND BOOTS

Keizi Nakamura, Chiba, Japan, assignor to Roman Shoji Co., Ltd.

Filed Sep. 8, 1988, Ser. No. 241,857
Claims priority, application Japan, Feb. 10, 1988, 63-29832
Int. Cl.[5] A43B 21/00
U.S. Cl. 36—34 A **5 Claims**



1. A plastic heel for shoes and boots having an outer surface of plastic material, said outer surface having an irregular figure which is a copy of a leather or leather-like surface, said plastic material comprising a thermoset resin selected from the group consisting essentially of phenol-formaldehyde resin, phenol-furfural resin, xylene-formaldehyde resin, ketone-formaldehyde resin, ureaformaldehyde resin, melamine-formaldehyde resin, anilineformaldehyde resin, alkyd resin, unsaturated polyester resin, and unsaturated epoxy resin; a thermoplastic resin selected from the group consisting essentially of polyethylene, polypropylene, polystyrene, poly-p-xylene, polyvinyl acetate, polyacrylate, polymethacrylate, polyvinyl chloride, polyvinylidene chloride, fluoroplastic, polyacrylonitrile, polyvinyl ether, polyvinyl ketone, polyether, polycarbonate, thermoplastic polyester, polyamide, diene-type plastic, polyurethane, and silicon; and a natural plastic selected from the group consisting essentially of natural gum, cellulose, protein and starch.

4,928,404

HEEL CUSHION

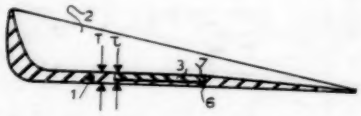
Rainer Scheuermann, Raisdorf, Fed. Rep. of Germany, assignor to Bauerfeind GmbH & Co., Kempen, Fed. Rep. of Germany

Filed Jan. 4, 1989, Ser. No. 293,222

Claims priority, application Fed. Rep. of Germany, Jan. 8, 1988, 8800116

Int. Cl.[5] A43B *13/12, 13/18*

U.S. Cl. 36—37 **5 Claims**



1. A heel cushion for incorporation in footwear below the heel of a user, comprising a heel bed composed of a relatively hard silicone rubber, and means inserted to form a soft region of silicone rubber located below the heel of the wearer and adapted to absorb excessive pressure, said bed being continuous below said region and said region being embedded in said bed.

4,928,405

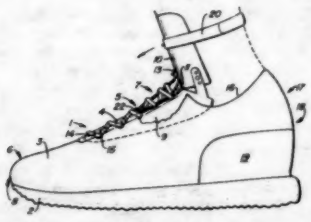
SHOE DYNAMIC FITTING SYSTEM

Richard G. Spademan, P.O. Box 6410, Incline Village, Nev. 89450

Continuation-in-part of Ser. No. 751,828, Jul. 5, 1985, which is a continuation-in-part of Ser. No. 461,832, Jan. 28, 1983, abandoned, which is a continuation-in-part of Ser. No. 50,436, Jun. 20, 1979, Pat. No. 4,494,324, which is a continuation-in-part of Ser. No. 886,946, Mar. 15, 1978, Pat. No. 4,382,342. This application Jun. 6, 1986, Ser. No. 871,733

Int. Cl.[5] A43B *23/26*

U.S. Cl. 36—50 **24 Claims**



1. A sport shoe comprising a sole and a relatively flexible upper adapted to enclose a foot of a user of the shoe, first tongue means adapted to be disposed between the foot and the upper, second tongue means adapted to engage a portion of a leg of the user, movement means interconnecting the first and second tongue means and permitting movement of the second tongue means relative to the first tongue means in response to relative movements between the user's foot and leg, and tightening means operatively coupled with the first and second tongue means for increasing the tightness with which the user's foot is enclosed by the shoe in response to a predetermined relative movement between the user's foot and leg.

4,928,406

SLIDE DEVICE FOR ADJUSTING THE RELATIVE ELEMENTS OF A SKI BOOT

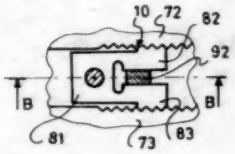
Benoit Montfort, Annecy, France, assignor to Salomon S. A., Annecy Cedex, France

Filed Dec. 28, 1988, Ser. No. 291,166

Claims priority, application France, Dec. 28, 1987, 87 18507

Int. Cl.[5] A43B *5/04*

U.S. Cl. 36—117 **10 Claims**



1. Device for the adjustment of the relative positions of two elements, a first of said elements being unitary with a guide track, and a second of said elements being unitary with a slider which is movable within and along said guide track, wherein said slider comprises two flexible arms at least substantially parallel to said guide track, each one of said arms enters laterally into contact with one side of the guide track and a control and locking lever jointed onto the slider about an axis which is parallel to a general plane of said flexible arms and perpendicular to their general direction, and wherein said lever further comprises a projection which, for the purpose of immobilizing the slider in position, fits between said two flexible arms so as to hold them laterally against said guide track when said lever is set in locked position, and which is withdrawn from between said flexible arms when said lever is placed in unlocked position.

4,928,407

SKI BOOT HAVING A HINGED SOLE

Marco T. Ottieri, 15 W. 53rd St., Apartment 15C, New York, N.Y. 10019

Filed Nov. 22, 1988, Ser. No. 274,910

Int. Cl.[5] A43B *5/04*

U.S. Cl. 36—119 **15 Claims**

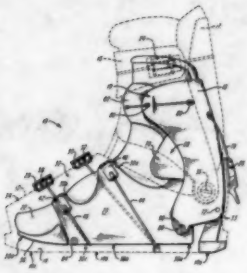
1. In a ski boot having an outer shell, with at least a sole portion and an upper portion, and a rear closure element higedly connected to the outer shell and movable between open and closed positions, the improvement comprising

inner sole means for supporting a wearer's foot, said inner sole means being disposed adjacent the sole portion of the outer shell and generally co-forming in shape to the underside of the human foot, and having phalanx, arch, metatarsal and heel regions,

fastening means for securing a portion of said inner sole means to said sole portion of said outer shell,

hinge means for allowing pivotal movement of he arch, heel and metatarsal regions of said inner sole means relative to the phalanx region, and

means engaged with said rear closure element and with said inner sole means for moving at least said heel and arch regions relative to said phalanx region, about said hinge



means, upon movement of said closure element between said open and closed positions, said means being located forward of the hinged connection of said rear closure element to said outer shell.

4,928,408

SKI BOOT WITH IMPROVED WEARABILITY

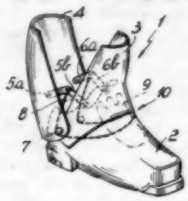
Giorgio Baggio, San Martino Du Lupari; Mario Gonella, Conegliano, and Mariano Sartor, Montebelluna, all of Italy, assignors to NORDICA S.P.A., Montebelluna, Italy

Filed Sep. 7, 1988, Ser. No. 240,908

Claims priority, application Italy, Sep. 17, 1987, 82587 A/87; Oct. 16, 1987, 82595 A/87

Int. Cl.[5] A43B *5/04*

U.S. Cl. 36—119 **37 Claims**



1. Ski boot comprising a shell, a rear quarter and a front quarter, at least said rear quarter being pivoted to said shell, said rear quarter being furthermore articulated to an element of said boot by means of rigid articulation means, wherein said rigid articulation means comprise two pairs of rod-like elements, each of said two pairs of rod-like elements interacting with at least one traction element acting on at least one foot presser.

4,928,409

MOBILE EARTH MOVER BOWL WITH LOADING ROTOR

Jan Mantingh, Broek 8, 9511 PT Gieterveen, Netherlands

Filed Sep. 23, 1988, Ser. No. 248,984

Claims priority, application Netherlands, Sep. 25, 1987, 8702301

Int. Cl.[5] B60P *1/00*; E02F *1/00*

U.S. Cl. 37—9 **10 Claims**

1. An earth mover comprising

(A) at least one wheeled axle;

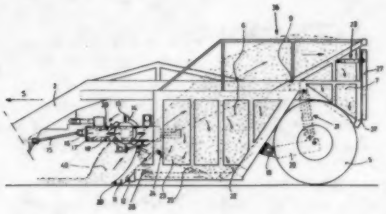
(B) a supported frame movable by said axle, said frame further including means for pushing up earth, comprising an elongate scraper blade with a ground-facing sharp longitudinal edge being substantially right-angled to the forward direction of travel of said frame,

characterized by

(C) a cylindrical rotor spaced from, and in operative position above, said scraper blade and substantially parallel thereto;

(D) means for rotating said rotor in a direction from said longitudinal edge towards the upper portion of said scraper blade;

(E) bars fixedly mounted on said rotor, with the distance



from the turning circle circumference of said bars to said scraper blade decreasing in the rotation direction of said rotor; and

(F) a frame-mounted bowl for earth transport having at least one compartment located behind said scraper blade, with at least one bottom portion extending obliquely downwards as a flap for unloading earth; said bottom flap being connected pivotally to said scraper blade near said one longitudinal edge and adapted to coact therewith for releasing and closing said compartment bottom portion, said bottom flap being connected furthermore to said frame by means of a sliding connection.

4,928,410

REVERSIBLE CLAM SHELL BUCKET

Darrell L. Walters, 2441 Cornelius Ave., Rio Oso, Calif. 95674, and Steven D. Larsen, 2165 California St., Sutter, Calif. 95982

Filed Jun. 17, 1987, Ser. No. 63,226

Int. Cl.[5] E02F *3/76*

U.S. Cl. 37—117.5 **18 Claims**

15. A material working tool used by operative connection to a prime mover comprising:

a first jaw having a one side connected to the prime mover and a second side facing away therefrom,

a second jaw removeably connected to said first jaw so as to assume one of two orientations, a first orientation wherein said second jaw has one tined edge which is turned toward said first jaw, and a second orientation wherein said tined edge is turned away from said first jaw,

wherein each said orientation has two extreme positions,

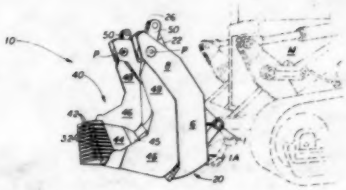
a first position wherein said second jaw is proximate to said first jaw,

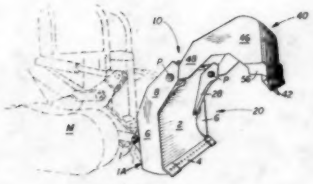
a second position wherein said second jaw is remote therefrom,

wherein removable fastening means connects said first and second jaws and includes a pivot at an upward extremity connecting said first and second jaw,

and a hydrualic cylinder connected between a lower portion of said first jaw and an upper portion of said second jaw,

wherein said distance between said pivot and a leading and trailing edge of said second jaw are of equal distance,





wherein the distance between a lowermost edge of said first jaw and said pivot equals the distance of the pivot to said leading and trailing edge of said second jaw.

4,928,411

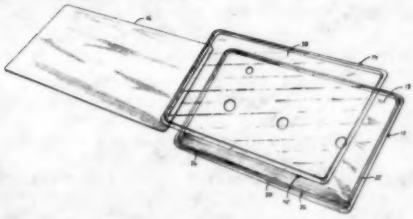
TRAY INCLUDING DISPLAY

Sara L. Danis, McLean; Charles L. Skaggs, Great Falls, and Charles A. Thomas, Fairfax, all of Va., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jul. 14, 1988, Ser. No. 218,794

Int. Cl.[5] G03F *3/00*

U.S. Cl. 40—324 **20 Claims**



1. A tray assembly comprising:

a substantially flat, rectangular, base having opposing longitudinal and transverse edges including an upper surface and a peripheral ridge extending upwardly from said upper surface;

a rectangular cover having opposing longitudinal and transverse edges mounted to said base, said cover including a channel defined in a lower surface thereof, said ridge being positioned within said channel;

an opening extending through said base, said opening providing access to said cover; and

means for locking said base to said cover, wherein said locking means includes a plurality of projections integral with and extending downwardly from opposing longitudinal edges of said cover, a plurality of slots defined within said base along the longitudinal edges of the base, said projections being positioned respectively within said slots, each of said slots, having a clearance below the peripheral ridge and extending inward, toward the opposing edge, said clearance permitting limited axial rotation of said projection when engaged in their respective slots along a common edge and enabling said cover to pivot away from the base for insertion or removal of a substrate.

4,928,412

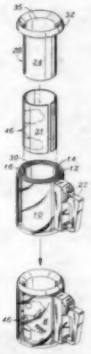
DECORATIVE CUP

Gary S. Nishiyama, 12103 Culver Blvd., Los Angeles, Calif. 90066

Filed Feb. 24, 1988, Ser. No. 160,487

Int. Cl.[5] G09F *3/00*

U.S. Cl. 40—324 **19 Claims**



1. A cup comprising

a base;

an inner wall, defining together with the base a recess for holding a beverage;

an outer wall connected to the inner wall, defining together with the inner wall a cavity, the cavity partially filled with liquid fluid surmounted by an air space, said outer wall being at least partially transparent;

a pump in communication with the cavity, the pump, upon activation, capable of forcing liquid fluid into the cavity and compressing the air space to create currents in any fluid in the cavity;

a handle affixed to the outer wall; and

means on said handle for activation of the pump.

4,928,413

DISPLAY DEVICE

Robert K. Rutchik, Lyons, Ill., assignor to Rapid Mounting & Finishing Company, Chicago, Ill.

Filed Jun. 9, 1988, Ser. No. 204,248

Int. Cl.[5] G09F *11/30*

U.S. Cl. 40—511 **11 Claims**

1. A display device comprising:

a first panel having a first display surface;

a second panel having a second display surface;

a cabinet having a viewing opening at the front thereof;

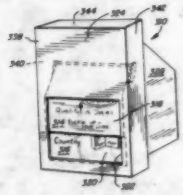
means for mounting the first and second panels in a first overlying relationship wherein the display surface on one of the first and second panels is exposed to view at the front of the cabinet and the one of the first and second panels blocks viewing of the display surface on the other of the first and second panels from the front side of the cabinet;

means for repositioning the first and second panels in a second overlying relationship wherein the display surface on the other of the first and second panels is exposed to

view at the front of the cabinet and the other of the first and second panels blocks viewing of the display surface on the one of the first and second panels from the one side of the cabinet,

said repositioning means including an arm, means for mounting the arm to the cabinet for reciprocating pivoting movement in first and second opposite directions in a predetermined path, drive means for moving said arm in said predetermined path, a yoke having means thereon for individually engaging and lifting said panels, and means for pivotably connecting the yoke to the arm for pivoting of the yoke relative to the arm about a single axis; and

cooperating means on the repositioning means and cabinet for causing the lifting means to (a) engage the one of the



first and second display panels that has its display surface exposed to view through the viewing opening, (b) lift the one display panel above the other display panel as said arm moves in a first portion of said predetermined path, (c) shift the one display panel behind the other display panel as the arm moves in another portion of said predetermined path and the yoke pivots relative to the arm and (d) release the one display panel as said arm moves in still another portion of said predetermined path so that the other display panel has its display surface exposed for viewing through the panel viewing opening,

whereby each time said arm moves in said first and second opposite direction in said predetermined path, the display surface exposed to view at the front of the cabinet can be changed.

4,928,414

SELF LUMINOUS CHARACTERS AND SIGNS INCORPORATING SAME

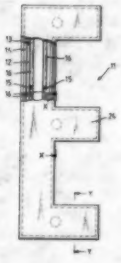
Alfred N. Bright, Marlow, England, assignor to Saunders-Roe Development Limited, Middlesex, United Kingdom

Filed Nov. 4, 1988, Ser. No. 267,436

Claims priority, application United Kingdom, Nov. 5, 1987, 8725925

Int. Cl.[5] G09F *13/28*

U.S. Cl. 40—551 **7 Claims**



1. A self-luminous character including a transparent light carrier having a plan shape defining substantially the desired shape of the character, a channel formed in a front surface of the light carrier, at least one longitudinally extending recess in the carrier located at the bottom of said channel, at least one self luminous light source located in said recess, and reflector means, whereby light emitted by the light source diffuses through the transparent carrier and is reflected by the reflector means to be emitted through the front surface of the carrier and illuminate the plan shape of the character.

4,928,415

FOLDING SIGN

Dale E. Walters, 569 Monceau Dr., St. Louis, Mo. 63135

Filed Jun. 14, 1989, Ser. No. 366,511

Int. Cl.[5] G09F *15/00*

U.S. Cl. 40—610 **15 Claims**

1. A durable, invertible, self-supporting sign formed of a single synthetic resin material board blank, comprising two stiffly resilient side panels, each side-panel having two flat surfaces for display of visual messages, said side panels when erected having an upper edge comprising a common integral resilient hinge for permanently reversibly interengaging said side panels, said side panels further having base portions for contacting a ground or floor surface and supporting the erected sign, said base portions forming legs located at each lower corner of the base portions for supporting the sign and raising it from the ground or floor surface, whereby to permit upright durable selective display of multiple different messages on the reverse sides of the sign and to permit selectively opened-flat or folded-flat shipping and storage of said sign.

4,928,416

AN ACCESSORY FOR ATTACHMENT OF PROMOTIONAL CHARACTERS TO PENS, KEY HOLDERS AND THE LIKE

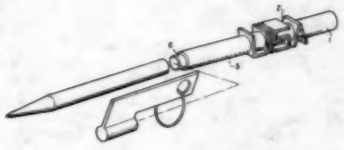
Gianluca Penno, Strada Maiole, 3/8 Moncalieri (TO), Italy

Filed Jul. 29, 1988, Ser. No. 226,203

Claims priority, application Italy, Jul. 30, 1987, 67664 A/87

Int. Cl.[5] G09F *7/02*

U.S. Cl. 40—618 **9 Claims**



1. An accessory to be attached to pens, key holders and similar products, for publicity and promotional ends, comprising:

an elongated body;

three-dimensional symbols, said symbols containing an aperture through which said body is inserted, and said aper-

ture being of the same shape and of a size slightly greater than the cross-section of said body; and

coupling means on said symbols to fasten said symbols to said body, said coupling means including a toothed member projecting from said symbol.

4,928,417

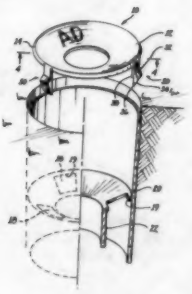
GOLF CUP ADVERTISING DEVICE AND METHOD

Louis H. Boudreau, Phoenix, Ariz., assignor to Boudreau/-Darque, Inc., St. Louis, Mo.

Filed Jun. 10, 1988, Ser. No. 205,119

Int. Cl.[5] G09F *3/00*

U.S. Cl. 40—642 **13 Claims**



1. An advertising device for a golf cup comprising:

a golf cup;

a substantially doughnut-shaped annular ring member having a center opening and having an external peripheral portion dimensioned to co-axially fit into said golf cup; and

advertising display means coupled to said ring member for displaying an advertisement visible to a golfer when adjacent to said golf cup.

4,928,418

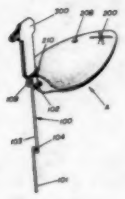
EXPANDABLE GOOSE DECOY

Mark Stelly, 2211 Coryell St., League City, Tex. 77573

Filed May 16, 1989, Ser. No. 353,401

Int. Cl.[5] A01M *31/06*

U.S. Cl. 43—3 **12 Claims**



1. A decoy apparatus resembling a goose, comprising:

a vertical stand;

a body loop rigidly attached to and extending in an ellipse from the stand, having its major axis horizontal and its minor axis vertical;

an expandable two-ply resilient body envelope in the shape of a goose body rotatably enveloping the body loop; and

wherein said body envelope can be selectively expanded to resemble a goose body by rotating the body envelope approximately perpendicular to the body loop, and the body envelope can be selectively flattened for storage by rotating the body envelope approximately coplanar with the body loop.

4,928,419

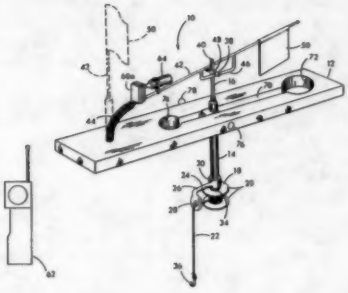
ICE FISHING APPARATUS AND SIGNALING DEVICE

Joseph M. Forrestal, 1800 Patton Pl., Janesville, Wis. 53546

Filed Feb. 27, 1989, Ser. No. 316,234

Int. Cl.[5] A01K *93/00*

U.S. Cl. 43—17 **4 Claims**



1. An apparatus for ice fishing comprising:

(a) a base adaptable to span a hole in the ice;

(b) a fishing line depending from the base;

(c) a trigger located proximate the base and engageable with the fishing line to be operated in response to a strike on the fishing line;

(d) a transmitter engageable with the trigger, the transmitter producing a radio signal when the trigger is operated in response to a strike on the fishing line such that the radio signal is remotely receivable by a receiver;

(e) an arm that is spring mounted to the base and extending between the trigger and the transmitter, the arm being movable from a trigger-held horizontal position to a vertical position, which actuates the transmitter to produce a signal; and,

a switch attached to the arm which forms a part of a completed circuit that enables the transmitter to produce a signal when the arm is in the vertical position.

4,928,420

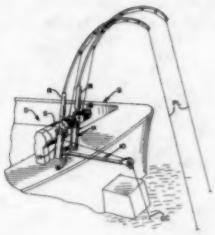
COLLAPSIBLE DOWNRIGGER ARM ASSEMBLY

Noel E. Jackson, 03400 22nd St., Otsego, Mich. 49078

Continuation of Ser. No. 42,708, Apr. 27, 1987, abandoned. This application Feb. 22, 1989, Ser. No. 314,307

Int. Cl.[5] A01K *89/00*

U.S. Cl. 43—27.4 **5 Claims**



1. A collapsible downrigger arm assembly capable of being

stored in a knocked-down condition and suitable for use with a fishing rod holding means and an associated downrigger mount and reel adjacent to said fishing rod holding means, said arm assembly comprising:

a plurality of elongated, cylindrical downrigger arm sections positionable in longitudinally aligned, end-to-end relationship;

guide pulley means mounted on the distal free end of the outermost one of said downrigger arm sections, said guide pulley means including a guide pulley about which an associated downrigger line is trained and guided;

means for releasably securing an innermost one of said downrigger arm sections to said downrigger mount; and

releasable joint means for releasably joining each contiguous pair of said downrigger arm sections to each other in said end-to-end relationship;

each said joint means comprising on the end portion of one of said downrigger arm sections of the respective contiguous pair a threaded shank and an unthreaded, anti-vibration support boss adjacent to and inwardly of said threaded shank the cross-sectional dimension of said boss being at least as large as the outer diameter of said threaded shank, and a bore defined in the abutting end portion of the other one of said downrigger arm sections of the respective adjacent pair, said bore having a threaded portion and a boss-receiving support socket positioned adjacent to and outwardly of said threaded bore, the cross-sectional dimension of said support socket being at least as large as the inner diameter of said threaded portion of said bore, the cross-sectional dimensions of said boss and support socket being substantially the same,

each said joint means further including a pair of abutting annular, cooperating locking surfaces provided on the downrigger arm sections of the respective adjacent pair, one of said locking surfaces being provided about and adjacent to said anti-vibration support boss and extending radially outwardly therefrom, and the other of said locking surfaces being positioned adjacent to and outwardly of said boss-receiving support socket and extending radially outwardly therefrom, and

each said joint means being releasably connectable by threaded engagement of said threaded shank with said threaded bore so that said anti-vibration support boss is received in closely-fitting relationship within said support socket and said locking surfaces are urged into an abutting relationship with one another pre-loading the threadedly engaged portions of the shank and the bore to resist bending flexure of said arm assembly and vibration-induced loosening of said joint means.

4,928,421

FISHHOOK DEVICE AND METHOD OF MAKING SAME

Rupert A. Staudner, Margate, Fla., assignor to Janet L. Staudner, Margate, Fla.

Continuation-in-part of Ser. No. 270,015, Nov. 14, 1988, abandoned. This application Sep. 8, 1989, Ser. No. 404,785

Int. Cl.[5] A01K *83/02*

U.S. Cl. 43—36 **22 Claims**

1. A fishhook device including a fishhook having a front side and a back side, a barb on the front side, a bend, a shank and an eye portion, the improvement comprising:

at least one piece of wire attached by substantially encircling the fishhook shank adjacent to the eye portion forming an attached end, and having a free end opposite the attached end;

at least one biasing bend substantially adjacent to the attached end and being adapted to bias the free end of the wire to a position distanced from the shank of the hook on the back side of the fishhook opposite to the front side with the barb; and,

a retaining member at least partially encircling the wire and the shank of the fishhook, and adapted for sliding movement relative to said wire and to said shank, whereby said fishing line can be secured to said retaining member and a fish strike on the fishhook will cause relative movement between the fishing line and the retaining member, and whereby said retaining member will release said wire and said wire will move under the force of said biasing bend to said position distanced from said shank to prevent the fish from swallowing the fishhook.

4,928,422

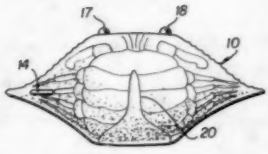
ARTIFICIAL BAIT CRAB-LIKE FISHING LURE

Michael G. Pitre, 309 E. 85th St., Cut Off, La. 70345

Filed Oct. 16, 1989, Ser. No. 421,908

Int. Cl.[5] A01K *85/00*

U.S. Cl. 43—42 **6 Claims**



1. An artificial bait crablike fishing lure comprising an anatomical outline on the lure underside resembling the underside of a real crab, and thereby being a legless, clawless bouyant wood crab body having upwardly tappered front and rear ends, a line securing eye on the upper front leading tappered end and a hook attaching eye on the lower trailing end of said crab body, and a weight mass in said body forwardly of its center causing its center of gravity to be shifted forward and the crab body to tilt downwardly when a line attached to the lure is being reeled in.

4,928,423

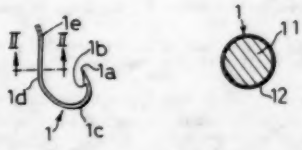
FISHHOOK AND METHOD FOR PRODUCING THE SAME

Yoshikazu Furuta, 116, Takiro-cho 6-chome, Tajimi-shi, Gifu-ken, Japan

Continuation-in-part of Ser. No. 222,081, Jul. 20, 1988, abandoned. This application Jul. 17, 1989, Ser. No. 383,301

Int. Cl.[5] A01K *97/02*

U.S. Cl. 43—43.16 **13 Claims**



1. A fishhook consisting of:

(a) a metallic base member having a fishhook-like shape provided with a point, a barb and a shank, and

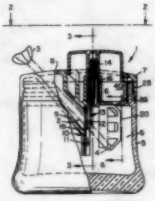
(b) at least one film layer made of a hard metallic compound selected from the group consisting of TiC, TiN and Ti(C,N), which is formed on said base member by chemical vapor deposition, whereby said fishhook resists wear and corrosion.

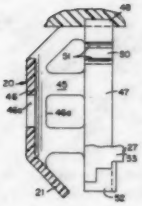
4,928,424

FLOWER STEM CUTTER

Anthony S. Campanelli, and Daniel A. Matré, both of Milwaukee, Wis., assignors to Rosestar® Incorporated, Milwaukee, Wis.

Filed Jul. 12, 1988, Ser. No. 217,943
Int. Cl.[5] A01G *3/00*
U.S. Cl. 47—1.01 15 Claims





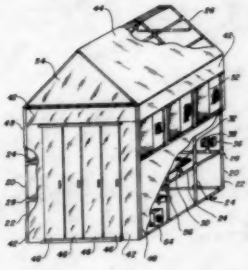
1. A flower stem cutter for severing of the outer end of an individual flower, comprising a manually portable container, a cover releasably attached to the upper end of said container, said cover being a generally cup-shaped member having a rim releasably secured to said container with the inner edge of the cover abutting said rim and having an upper curved enclosure wall projecting upwardly of the end of said container, said cover including a diametric tubular slot projecting inwardly from one side of the cover across about one-half the diameter of the cover and the container, a guide member projecting inwardly and downwardly into said container, said guide member terminating in a vertical fixed blade support wall, a flat cutting blade secured to said support wall, said support wall and blade including an opening generally aligned with each other and the guide member, a lower edge of said fixed blade opening defining a flat cutting surface, a movable blade unit having a supporting stem extending through said cover and having a horizontal wall and a vertical blade support abutting said fixed blade, a guillotine blade secured to the ax inner face of said vertical blade support and being secured in angular relationship thereto, said movable guillotine balde extending from said wall and terminating in a pointed inner end, said pointed inner end having a surface abutting the fixed blade and locating the cutting edge of said movable blade in sliding abutting engagement with said fixed blade, means coupled to said stem and resiliently supporting said movable blade in a raised position with said cutting edge of said movable balde located immediately above said fixed blade opening and said fixed blade, said stem being movable inwardly against said resilient means to move said movable blade downwardly across said opening and past said flat cutting surface of said fixed blade, a generally U-shaped guard, said guard having side walls projecting downwardly from the opposite sides of said horizontal wall to enclose the movable blade, said side walls projecting outwardly of said support wall, an outer base wall secured to said sidewalls and generally aligned with said movable blade, said outer base wall having a bottom lip extending inwardly toward said support wall, said lip being a solid wall member generally aligned with an extension of the path of said tubular guide opening and defining a stop wall engaged by the stem for locating of the stem with respect to said cutting blade.

4,928,425

GREENHOUSE WITH INTEGRAL HUMIDIFIER

Robert M. Walker, Jr.; Robert M. Walker, Sr., and Laura B. Walker, all of 3620 Homeway Dr., Los Angeles, Calif. 90008

Filed Nov. 28, 1988, Ser. No. 276,522
Int. Cl.[5] A01G *9/00*
U.S. Cl. 47—18 18 Claims



1. A light permeable greenouse plant enclosure with an integral humidifier comprising:

(a) a hollow framework structure having upwardly extending corner members, a plurality of connecting members disposed therebetween and a plurality of roof members, all having internal communication with each other, capable of support pressure inside and sufficient structural integrity to reinforce the greenhouse:

(b) water under pressure fluidly disposed within said hollow framework defining a distribution network therethrough such that the framework becomes a conduit to circulate water throughout the greenhouse enclosure;

(c) water atomizing means in communication with both framework structure and said pressurized water, positioned in such a manner as to spray the water in a mist form within the confines of the framework to elevate the humidity of air within the greenhouse;

(d) transparent enclosure means contiguously encompassing said framework such that sunlight penetrates therethrough while impeding the transmission of air creating an isolated environment conclusive to the growing of plants in a humidified surrounding;

(e) non-penetrating attaching means connecting the transparent enclosure means securely onto the framework creating a structural bond therebetween allowing the transparent enclosure means to withstand environmental forces, such as wind loading, rain and snow;

(f) air circulating means integral with said enclosure means defined by said enclosure having a plurality of adjustable openings that allow air entrance and egress providing limited temperature control relative to air heated by the sun's penetration through the transparent enclosure through natural air moving phenomenon; and

(g) a shelf substructure integral with said hollow framework structure having a plurality of shelves projecting inwardly

in a horizontal manner with the shelves removably resting thereupon providing a platform for mounting plants and an attachment position for said atomizing means.

4,928,426

TROUGH FOR SOIL IRRIGATION AND MOISTENING

Luc Janssens, 19, Berkenlaan, B-2610 Wilrijk-Antwerpen, Belgium

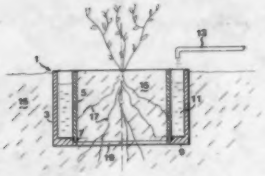
PCT No. PCT/BE88/00006, § 371 Date Oct. 31, 1988, § 102(e) Date Oct. 31, 1988, PCT Pub. No. WO88/06401, PCT Pub. Date Sep. 7, 1988

PCT Filed Mar. 2, 1988, Ser. No. 278,942

Claims priority, application Luxembourg, Mar. 4, 1987, 86799

Int. Cl.[5] A01G *25/06*; E02B *13/00*

U.S. Cl. 47—48.5 12 Claims



1. A trough for irrigating and moistening soil, said trough having a closed bottom end and an open top end and comprising:

a water impermeable bottom member defining the closed bottom end; and

sidewalls extending upwardly from the water impermeable bottom member to open top end, said sidewalls comprising a mixture of a calcium sulfate cement with from 40 wt % to about 80 wt % water and said sidewalls exhibiting a selected permeability.

4,928,427

IRRIGATION SYSTEM

James A. Patterson, 2074 20th St., Sarasota, Fla. 34234

Filed Aug. 14, 1989, Ser. No. 393,539

Int. Cl.[5] A01G *25/06*; E02B *13/00*

U.S. Cl. 47—58 23 Claims

1. A method of irrigating soil below the surface comprising the steps of:

placing a coil having a coil axis in the soil with said coil axis substantially parallel to the soil surface;

said coil having constant overall dimensions and formed of a flexible and pliable, hollow tubular fiber;

said fiber having a constant diameter and having a wall permeable to water;

introducing water into said coil.

4,928,428

LEVER-ACTIVATED LOCKING BAR BRACE FOR A WINDOW OR A DOOR

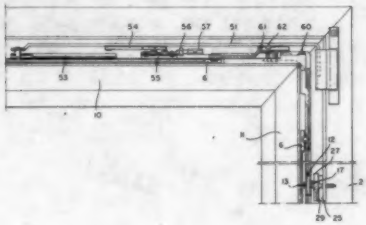
Axel Gebhardt; Bernd Diekmann, both of Bielefeld, and Rüdiger Schmidt, Lage, all of Fed. Rep. of Germany, assignors to Schuco Heinz Schurmann GmbH & Co., Fed. Rep. of Germany

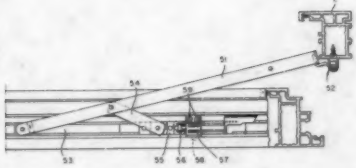
Filed Dec. 18, 1986, Ser. No. 943,665

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1985, 3545861525

Int. Cl.[5] E05D *15/52*

U.S. Cl. 49—192 20 Claims





1. A housing outlet, such as a window or a door, comprising

(a) an inner closure frame provided with a C-shaped receiving groove and having a plurality of sections including lower and upper horizontal sections and a hinge-side vertical wing, said receiving groove having a bottom wall;

(b) a locking bar brace including a handle and a plurality of locking bars slidably supported in said receiving groove, said locking bars each having a U-shaped cross-section with two side legs of a predetermined length, each of said side legs having a side groove extending over a full length of said legs, each of said side grooves being limited by a lower web having a thickness of S_1 and an upper web with a thickness S_2, said side grooves having a height N, said receiving groove having a height H_1 which is greater than a height H_2 of said locking bar by the thickness S_1 of said lower web, said receiving groove and said locking bar having a cross-section which is the same in all of said sections of said closure frame, and said receiving groove having an inwardly extending edge strip which has a height H_3 less than the height N of said side grooves, said locking bars being slidably supported with said legs on said bottom wall of said receiving groove in said lower and upper horizontal sections and being supported at a handle-side on said edge strip of said receiving groove in said hinge-side vertical wing;

(c) a plurality of locking pieces connected with said locking bars of said vertical hinge-side section and said lower horizontal section;

(d) anchoring pins connecting said locking pieces with said vertical and lower horizontal sections, said locking pieces being provided with rectangular plates having longitudinal sides with side grooves, said plates having a side oppo-

site to said anchoring pins and being provided at said side with a bearing pin; and

(e) a metal roller rotatably supported on said bearing pin.

4,928,429

SECURITY VESTIBULE ENTRY FOR CONTROLLED ACCESS TO BANKS AND THE LIKE

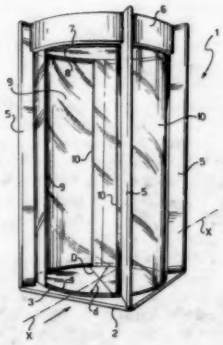
Attilio Colombo, Busto Arsizio, Italy, assignor to Tonali S.p.A., Varese, Italy

Filed Aug. 24, 1988, Ser. No. 236,011

Claims priority, application Italy, Aug. 28, 1987, 21748A/87

Int. Cl.[5] E06B *3/34*

U.S. Cl. 49—41 **5 Claims**



1. A security vestibule comprising a base, a top, a first wall extending from said base to said top along an arc of a circle having a first diameter, a second wall extending from said base to said top along an arc of a circle having a second diameter larger than said first diameter, opposed first circular tracks associated with said base and said top for engaging said first wall for displacement along said first tracks, opposed second circular tracks associated with said base and said top for engaging said second wall for displacement along said second tracks, said second tracks being concentric with and of larger diameter than said first tracks, said first and second walls forming doors of said vestibule and having a combined angular breadth equal to or greater than by a small amount 360°, said base and said top closing said vestibule at opposed ends thereof and said walls in selected positions thereof defining an entrance into and an exit from said vestibule across at least a portion of said base, said base being suitable for supporting at least one person thereon for passage through said vestibule between said entrance and said exit, and four vertically extending supports for supporting said top, said supports being at corners of a square having sides adjacent one of said first and said second tracks.

4,928,430

PIVOTABLE BUMPER GUARD

Harry George, 8 S. 511 Bell Dr., Naperville, Ill. 60565

Filed Apr. 4, 1989, Ser. No. 333,126

Int. Cl.[5] E06B *3/30*

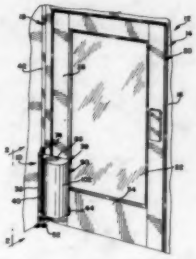
U.S. Cl. 49—460 **14 Claims**

1. A bumper guard pivotable between a normal and a retracted position for use with a door which pivots inward and outward from a closed position about a pivoting door stile, comprising:

a stationary support:

a bumper, said bumper being in abutting contact with said stationary support and being located adjacent to said pivoting door stile when in its normal position; and

pivot means pivotally joining said bumper to said stationary support, said pivot means allowing said bumper to pivot between its normal and its retracted positions, wherein said bumper, when in the retracted position, will allow said door to pivot towards said bumper to a position



which is disposed from said closed position of said door by at least 90°.

4,928,431

DOOR WEATHER STRIP FOR MOTOR VEHICLE

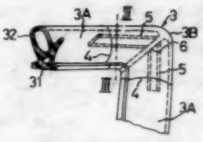
Michio Kuzuhara, Kakegawa; Jun Shibasaki, Ichinomiya, both of Japan; Andree St. Louis, Waterville, Canada; Christian St. Laurent, Waterville, Canada, and Michel Bedard, Waterville, Canada, assignors to Toyoda Gosei Co., Ltd., Nishikasugai, Japan and Waterville TG, Inc., Waterville, Canada

Filed May 19, 1989, Ser. No. 354,297

Claims priority, application Japan, May 25, 1988, 63-128080

Int. Cl.[5] E06B *7/16*

U.S. Cl. 49—479 **6 Claims**



1. A weather strip for providing a seal between a door opening of a body of a motor vehicle and a door frame, comprising:

extruded members; and

a molded member for connecting ends of said extruded members;

each of said extruded members and said molded member being provided with a base portion to be attached along the door opening or the door frame, and a tubular sealing portion projecting from said base portion to be pressed by the body of the motor vehicle or the door frame when a door is closed;

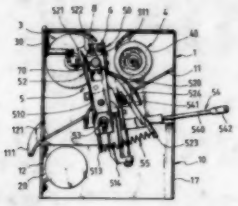
said tubular sealing portion being provided with a bridge connecting opposing inner side surfaces of said sealing portion, said bridge extending so as to cross a connection boundary between each of said extruded members and said molded member in a direction perpendicular to said connection boundary.

4,928,432

RODS PRECISION CUTTING-OFF AND END SURFACE GRINDING MACHINE

Chin-lung Yang, 9 Lane 166, Chimei St., Sanchung City, Taipei Hsien, and Chung-tien Lee, 78 Lane 29, Huancheng Road, Hsinchuang City, Taipei Hsien, both of Taiwan

Filed Aug. 29, 1988, Ser. No. 237,844
Int. Cl.[5] B24B *27/06*
U.S. Cl. 51—5 C 3 Claims



1. A rod precision cut-off and end surface grinding machine, comprising:

a housing, which is generally a rectangular housing body, consisting of an inclined plate in the shape of a ramp with a lower end extending to an outer side of a left side wall of the housing whereon a U-shaped discharge hopper with a supporting edge on two sides is installed, a plurality of longitudinal and lateral partitions, a notch provided to the upper side of a front side wall and an upper wall of said housing respectively, a T-slot provided to a right side wall thereof, and a rear cover plate capable of optional opening and closing pivotally installed on the back thereof;

a set of drive devices, consisting chiefly of a motor, a double-grooved drive belt roller, two single-grooved driven belt rollers, two transmission belts and a set of belt automatic tension adjusting devices, wherein the motor is installed on the lower side of a side wall of said housing body, the double-grooved drive belt roller is installed on the said motor, the two single-grooved driven belt rollers are installed on drive shafts of cut-off and end surface devices respectively and each device connected to the double-grooved drive belt roller by a belt, one end of said belt automatic tension adjusting device is pivotally installed on the inner side of a side wall of said housing body, and another end thereof is provided with a roller between the said two transmission belts;

a cut-off device, consisting chiefly of a cut-off sander installed on one end of a sander drive shaft by a positioning nut and a locking nut, wherein the sander drive shaft is pivotally installed between two lateral partitions on one side in the housing body, and another end thereof is provided with said single-grooved belt roller of said drive devices;

an end surface grinding device, consisting chiefly of a cylindrical grinding sander locked on one end of cylindrical sander drive shaft pivotally installed in a crank hollow shaft which is pivotally installed, together with the cylindrical sander drive shaft, between two lateral partitions on another side in the housing body, and another end of the cylindrical sander drive shaft is provided with said other single-grooved belt roller of said drive device; and

a rod chucking device, consisting chiefly of a primary chuck, a secondary chuck, a fixing shaft, a controlling lever, a chucking spring, and two sets of tapered fixing stud and nut, wherein the primary chuck is generally a rectangular plate with a central slot penetrating therethrough, provided with a chuck jaw and a chuck mouth at an upper end, and an extension rod for securing the chucking spring at the lower end; the secondary chuck body is roughly a Z-shaped member, provided with a chuck jaw and a chuck mouth at an upper end, corresponding to the said jaw and mouth of primary chuck, and an extension rod at the lower end for securing the chucking spring, and inserted in the central slot of primary chuck body and pivotally installed by a pin shaft so that the secondary chuck cooperates with the primary chuck to open and close as a pincer fixture; the chucking spring is installed between the two extension rods at the lower ends of said two chuck bodies; the fixing shaft having eyelets at both ends is installed on the lower side of primary chuck body and parallels the edge of the mouth of primary chuck body, and the two ends of said shaft are pivotally installed between the lateral partition in the housing body and the front side wall of said housing body by means of a tapered fixing screw and an adjusting nut; the controlling lever is generally a T-lever body pivotally installed on a U-frame which is integrally made together with the primary chuck body, an arc-shaped inclined cam is installed on the front end of said lever body, and a roller is pivotally installed on the secondary chuck body;

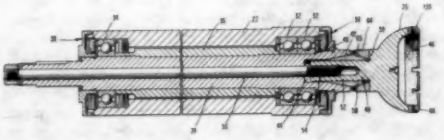
which is chiefly characterized by the following operations: to put the controlling lever of the rod chucking device in the central position of T-slot on the right side of housing body and move the said lever in the right horizontal direction along the said slot so that the arc-shaped cam at the front end of said lever pushes the secondary chuck body to open its mouth to receive a rod, then to move the said lever back to its original position and then up and down along the said T-slot so that the pincer fixture of rod chucking device can chuck the rod to be precisely cut off by the cut-off device and then the end surface of said rod is precisely ground by the end surface grinding device, therefore, the rod can be precisely shortened and the end surface thereof can be ground and flattened at the same time.

4,928,433

APPARATUS FOR EFFECTING RAPID REPLACEMENT OF LENS CUTTING TOOLS

Roy R. Gray, Muskogee, Okla., assignor to Coburn Optical Industries Inc., Tulsa, Okla.

Continuation-in-part of Ser. No. 937,251, Dec. 3, 1986, abandoned. This application Mar. 24, 1988, Ser. No. 172,553
Int. Cl.[5] B24B *13/01*
U.S. Cl. 51—33 W 11 Claims



1. A lens cutting machine for generating a surface on a lens blank, comprising:

support means defining a reference plane,

tool mounting means mounted on said support means for rotation about a longitudinal axis of rotation which intersects said reference plane, said tool mounting means including a first stop surface disposed at a preset relationship relative to said reference plane, and

a tool assembly including a tool element having a cutting edge for grinding a lens, and a stop element carried by said tool element and defining a second stop surface, said tool assembly being removably mounted to said tool mounting means to bring said second stop surface into engagement with said first stop surface,

said stop element being longitudinally adjustable relative to said tool element prior to mounting of said tool assembly to said tool mounting means to adjust the location of said cutting edge relative to said second stop surface so that said cutting edge is disposed at a predetermined relationship relative to said reference plane in

response to engagement between said first and second stop surfaces during mounting of said tool assembly to said tool mounting means.

4,928,434

LAPPING INTERNAL SURFACES

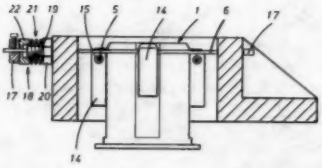
Cassanelli Gianfranco, Bologna, Italy, assignor to Trimate, Bologna, Italy

Filed Oct. 7, 1988, Ser. No. 254,699

Claims priority, application Italy, Oct. 30, 1987, 3676 A/87

Int. Cl.[5] B24B *33/00*

U.S. Cl. 51—3.4 H **11 Claims**



1. Improved equipment for lapping internal surfaces, comprising

a composite lapping tool comprising a vertical rod uppermost, carried by a spindle, a cone at bottom which ensheaths the rod in a loose fit so as to allow a marginal freedom of transverse movement between the rod and the cone, and an abrasive diamond shell ensheathing and rigidly associated with the cone; and

a work chucking mechanism, positioned beneath the spindle and capable of oscillating about an axis disposed substantially coaxial with, or parallel to, that of the tool, wherein the vertical rod comprises three rigidly connected sections: a bottom section of polygonal transverse profile engaging to an exact fit in a corresponding axial socket afforded by the cone and accommodating a diametral pin, a middle section, possessing a moderate degree of elasticity commensurate with the tolerances prescribed for the lapping operation and ensuring sufficient torsional rigidity to function as a flexible coupling, and a top section connected to the spindle.

wherein the chucking mechanism is suspended from at least three cables passing through respective peripheral hollow mountings on the chucking mechanism itself.

4,928,435

APPARATUS FOR WORKING CURVED SURFACES ON A WORKPIECE

Takeshi Masaki, Kawasaki; Koichi Kawata, Tama, and Yukuo Sakagaito, Yokohama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 865,419, May 21, 1986, abandoned. This application Jun. 15, 1988, Ser. No. 206,724

Claims priority, application Japan, May 21, 1985, 60-108815; Nov. 8, 1985, 60-251339

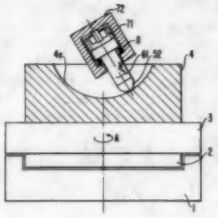
Int. Cl.[5] B24B *13/00*

U.S. Cl. 51—55 **11 Claims**

1. An apparatus for working aspherical surfaces on a workpiece comprising:

a spindle having a tool on an end portion thereof;

means for adjusting said spindle so that a center axis of said spindle coincides with a normal direction at every point on an assumed aspherical surface to be fabricated on the workpiece where said center axis of said spindle intersects the assumed aspherical surface;



means for driving said spindle;

means for rotating said workpiece; and

means for applying said tool to said workpiece with a substantially constant pressure.

4,928,436

DEVICE FOR SHARPENING KNIVES

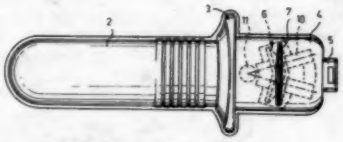
Olavi Lindén, Billnäs, Finland, assignor to Fiskars Oy Ab, Helsinki, Finland

Filed Jan. 17, 1989, Ser. No. 297,964

Claims priority, application Finland, Jan. 20, 1988, 880233

Int. Cl.[5] B24B *7/08*

U.S. Cl. 51—80 BS **17 Claims**



1. A device for sharpening knives, comprising a frame, a grinding element freely rotatably mounted on an axle of the frame, which grinding element consists of two truncated cones, the axles of which are turned 180° in relation to each other, and a means arranged in said frame for steering the knife in the sharpening direction, whereby the grinding element is pivotally mounted between two end grinding positions, the grinding element being pivoted around one end of its axle, which in said end grinding positions forms angles with respect to the sharpening direction of the knife, which angles are smaller and larger, respectively, than 90°.

4,928,437

MEANS AND METHOD FOR RESETTING A CYLINDRICAL GRINDING MACHINE

Werner Waelti, Selzach, Switzerland, assignor to Werkzeugmaschinenfabrik Tschudin, Grenchen, Switzerland

PCT No. PCT/CH86/00161, § 371 Date Sep. 2, 1987, § 102(e) Date Sep. 2, 1987, PCT Pub. No. WO87/03237, PCT Pub. Date Jun. 4, 1987

PCT Filed Nov. 24, 1986, Ser. No. 102,019

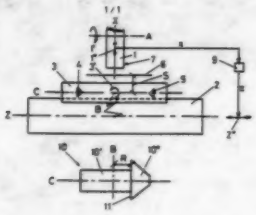
Claims priority, application Switzerland, Nov. 25, 1985, 5042/85

Int. Cl.[5] B24B *49/00*

U.S. Cl. 51—165.71 **4 Claims**

1. In a method of resetting a cylindrical grinding machine comprising: at least one grinding wheel (1), said at least one

grinding wheel being rotatable about an axis A, said at least one grinding wheel being translatable along an axis X, said axis X being perpendicular to said axis A; a turning slide (2), said turning slide being translatable along an axis Z; a rotary table (3) rotatably disposed on said turning slide (2), said rotary table being rotatable around an axis B, said axis B being perpendicular to said axis Z, said rotary table (3) being designed and equipped to receive a workpiece (10) which is to be ground, said workpiece being held between two turning centers (4,5) defining an axis C; and a numerical control computer means (a) for effecting relative movement between said at least one grinding wheel, said turning slide and said rotary table; said method comprising: grinding a workpiece (10) along a grind-



ing line (6), with rotation of said rotary table (3) about said axis B until said axis of said workpiece (10) is parallel to said axis Z of said turning slide (2) as determined by the production of a calibration cylinder having predetermined dimensional requirements; wherein the improvement comprises inputting the thus defined rotational position of the C axis with respect to the B axis into said numerical control computer means for resetting said axis C parallel to said axis Z; and, based on the position of the grinding wheel on said X-axis and the diameter of the calibration cylinder, calculating a distance (S) between the grinding line (6) and the axis C and inputting said distance (S) to the computer for resetting the final position of said grinding wheel on said axis X during grinding.

4,928,438

WAFER PROCESSING FILM

Osamu Narimatsu, Nagoya; Michiyasu Ito, Kuwana; Kazuyoshi Komatsu, and Yasuhiro Shibata, both of Nagoya, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Division of Ser. No. 823,492, Jan. 16, 1986, Pat. No. 4,853,286. This application May 26, 1988, Ser. No. 357,351

Claims priority, application Japan, Aug. 7, 1984, 59-16438; May 29, 1987, 59-107539

Int. Cl.[5] B24B *1/00*

U.S. Cl. 51—283 R **5 Claims**

1. A method of grinding the surface of a wafer comprising the following steps:

affixing an adhesive layer disposed on one surface of a base film having a Shore D hardness of 40 or less, to a first surface of a wafer having first and second surfaces; and

grinding said second surface of said wafer.

4,928,439

LENS EDGING MACHINE AND METHOD

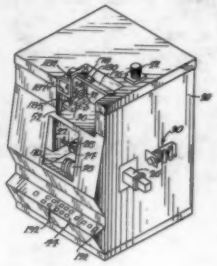
Rolando P. Ramos, Des Plaines; Wilfredo P. Loreto, Hoffman Estates, and Yordan Vulich, Oak Lawn, all of Ill., assignors to AIT Industries, Inc., Schaumburg, Ill.

Division of Ser. No. 551,148, Nov. 14, 1983, Pat. No. 4,807,398. This application Jan. 9, 1989, Ser. No. 294,231

Int. Cl.[5] B24B *9/14*

U.S. Cl. 51—284 E **19 Claims**

10. A method of grinding the peripheries of ophthalmic lenses, comprising the steps of mounting a pattern for rotation about an axis and on a clapper switch and for movement of the axis toward and away from the clapper switch; actuating the clapper switch upon engagement thereof by the pattern; mounting a lens for rotation about an axis and for movement of the lens periphery against and away from a grinding surface of a grinding wheel; moving the axis of rotation of the lens toward and away from the grinding surface in accordance with movement of the axis of rotation of the pattern toward and



away from the clapper switch; rotating the pattern and lens conjointly whenever the clapper switch is actuated to grind the lens periphery to a configuration complementary to that of the pattern; and terminating grinding of the lens periphery only upon uninterrupted actuation of the clapper switch for at least a selected time.

4,928,440

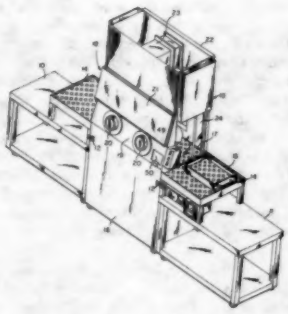
DECONTAMINATION BOOTH

Joel J. Hughes, Wilmington, N.C., assignor to Container Products Corp., Wilmington, N.C.

Filed Mar. 30, 1987, Ser. No. 31,611

Int. Cl.[5] B24C *3/00*

U.S. Cl. 51—426 **4 Claims**



1. A decontamination booth including an atmospherically sealed cabinet having a source of vacuum connected thereto for applying a negative pressure in a work area within the cabinet and a steam/abrasive application gun within the work area, comprising:

(a) a cabinet having a base for housing a decontamination refuse container,

(b) a work area within said cabinet having a work piece supporting grate separating it from said base,

(c) an inclined viewing window for said work area including work glove ports,

(d) a air intake plenum including a means for directing a current of air over the inclined interior surface of said viewing window,

(e) a pair of access doors for said work area on each side wall of said cabinet,

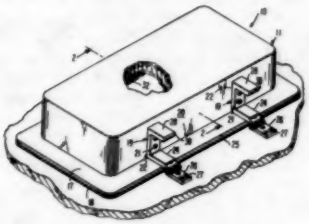
(f) pneumatic cylinders positioned exteriorly of said cabinet and above the side door openings and having their movable pistons connected to the outside surface of each of said doors for moving the same through a vertical plane within the confines of said work area and above said work piece supporting grate into an open or closed position, and
(g) stationary door edge receiving gaskets sealing the periphery of said access doors against the ambient atmosphere when in a closed position.

4,928,441

ATTIC ACCESS STAIRWAY COVER

John G. Daley, 2143 Echo La., Wilmington, N.C. 28403, assignor to John G. Daley, Wilmington, N.C.

Filed Jul. 31, 1989, Ser. No. 387,751
Int. Cl.[5] E04B *7/18*
U.S. Cl. 52—19 **2 Claims**



1. An attic access stairway cover, comprising in combination, an inverted tub-shaped main body for removable placement over an attic access opening through an attic floor, hinge means attached to said main body for upwardly pivoting of said main body away from said opening, and a cavity on an underside of said main body for an attic folding stairway to be upwardly stored therewithin from below; said main body comprising a strong central core sandwiched between layers of plastic; said main body being rectangular in shape and having a padded outwardly flange around its edge for resting upon said attic floor; and said hinge means comprising a pair of hinges attached to a longer side of said main body and each said hinge including stop means for abutment against said attic floor and limit a pivotal travel thereof.

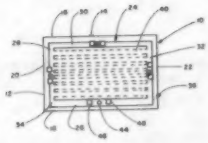
4,928,442

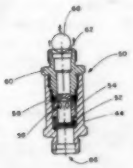
INFLATABLE TENTS

Keith Kroetch, and Colleen Fitzpatrick, both of 1725 N. Fairmont Loop, Coeur D'Alene, Id. 83814

Filed May 9, 1989, Ser. No. 349,483
Int. Cl.[5] E04H *15/20*
U.S. Cl. 52—2 J **1 Claim**

1. An inflatable tent comprising:
a rectangular mattress element which includes
(1) a ground-engaging surface,
(2) a user-supporting surface,
(3) first and second sides and first and second end walls connecting said surfaces together to define a closed compartment having a chamber therein,
(4) a mattress manifold system located in said chamber and being adapted to hold air for inflating said mattress element and which includes
(a) a first manifold extending adjacent and parallel to said first end wall and including a first mattress-mounted check valve fluidically connected thereto and having an inflation stem fluidically connected thereto,
(b) a second manifold extending adjacent and parallel to said first side wall and being fluidically connected to said first manifold and including a second mattress-mounted check valve fluidically connected thereto,
(c) a third manifold extending adjacent and parallel to said second end wall and including a third mattress-mounted check valve fluidically connected thereto and being fluidically connected to said second manifold, and
(d) a fourth manifold extending adjacent and parallel to said second side wall and including a fourth mattress-mounted check valve fluidically connected thereto and being fluidically connected to said first end manifold and to said third manifold,
(5) an air inlet valve fluidically connected to said first manifold inflation stem and mounted on said mattress element for conducting air from a source into said first manifold,
(6) a plurality of air conduits each connected to said first and third manifolds to receive air therefrom to inflate said mattress element, said air conduits being spaced apart from each other and extending parallel to each other and parallel to said second and fourth manifolds, and being connected together only via said first and third manifolds,
(7) each mattress element check valve of said mattress element check valves having means for normally closing said each mattress element check valve and including
(a) an in-line check valve having a casing mounted on said mattress element,
(b) a poppet slidably mounted in said casing and having a plurality of orifices defined therein,





(c) a land element on said casing to close said orifices when said poppet is in a first position, and
(d) a spring urging said poppet towards said first position,
(8) accessory attaching means mounted on said mattress element adjacent to each mattress element check valve; and
(9) a user-covering accessory which includes
(a) an accessory manifold,
(b) a plurality of accessory air conduits each fluidically connected to said accessory manifold to receive air therefrom to inflate said accessory,
(c) an accessory check valve fluidically connected to said accessory manifold to conduct air into said accessory manifold, and
(d) means on said accessory check valve to releasably couple said accessory check valve to one mattress element check valve of said mattress element check valves, and which includes
(i) a body which is sized to slidably fit into said one mattress element check valve casing to engage the check valve poppet of said one mattress element check valve and move that poppet away from said first position when pressed into the casing of said one mattress element check valve, and

(ii) a back-flow preventing ball on said body and which includes a spring biasing said ball into said body to prevent flow of air from said accessory manifold into said mattress manifold system, and

(e) mattress element attaching elements mounted on said accessory adjacent to each accessory check valve for releasably coupling said accessory to said mattress element, and

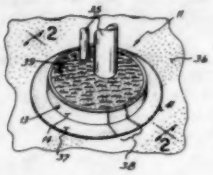
(10) said user-covering accessory including a portion covering a user's head.

4,928,443

POURABLE SEALER POCKET

Ronald L. Goodman, and Richard E. Kelley, Sr., both of Carlisle, Pa., assignors to Carlisle Corporation, Cincinnati, Ohio

Filed Mar. 1, 1989, Ser. No. 317,540
Int. Cl.[5] E04D 1/36
U.S. Cl. 52—58 **6 Claims**



1. A pourable sealer pocket comprising a collar having elongated upper and lower edges, a first end and a second end and means to connect the first and second ends of the collar to form a cylinder;

a water impervious, stretchable membrane strip bonded to said collar, a first lower portion of said membrane extending below the lower edge of the collar,

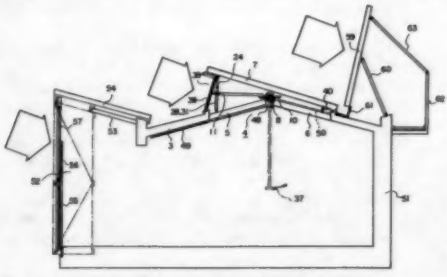
wherein said membrane strip is effectively stretchable to permit bending of said lower portion of said membrane normal to said collar to form an annular flange when said collar is formed into said cylinder.

4,928,444

SOLAR HOUSE WITH ROOF BOARD OF ADJUSTABLE INCLINATION

Mitsukazu Horie; Shigemitsu Horie, and Haruo Horie, all of Hiromi 2381-1, Kani-shi, Gifu-ken 509-02, Japan

Filed Jul. 7, 1988, Ser. No. 216,093
Claims priority, application Japan, Jul. 8, 1987, 62-171620
Int. Cl.[5] E04B 7/16
U.S. Cl. 52—66 **8 Claims**



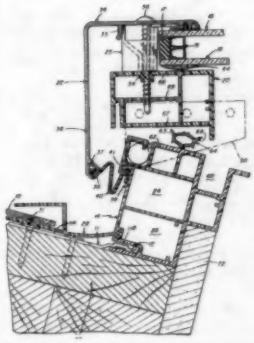
1. In a roof structure of a building having two roof surfaces which meet at a top ridge, one said roof surface being downwardly inclined away from the ridge in a generally southernly direction, and the other roof surface being downwardly inclined away from the ridge in a generally northernly direction, comprising a south side opening extending upwardly through said one roof surface in the vicinity of said top ridge, a north side opening extending upwardly through said other roof surface in the vicinity of said ridge, said south side and north side openings being disposed in adjacent relationship to one another on opposite sides of said ridge, a rotary shaft rotatably supported on the roof structure and extending generally along the top ridge, a roof board for selectively closing one of the south side and north side openings, the roof board having a central part supported by said rotary shaft as a fulcrum for swinging movement between a first position wherein a southern portion of said roof board closes said south side opening and a second position wherein a northern portion of said roof board closes the north side opening, said southern and northern portions of said roof board being disposed on opposite sides of the fulcrum, said north side opening being uncovered when the roof board is in said first position, said south side opening being uncovered when the roof board is in said second position, said roof board defining outer end edge portions which define opposite free ends of the north and south portions of the roof board and which extend generally parallel with said rotary shaft, one of the end edge portions being spaced upwardly above the respective opening when the other opening is covered by its respective northern or southern portion, and a skylight supported on said roof board adjacent said one end edge portion thereof.

4,928,445

SKYLIGHT CONSTRUCTION

Robert Sampson, Sanford, and Sean Flanigan, Wells, both of Me., assignors to Wasco Products, Inc., Sanford, Me.

Filed Dec. 13, 1988, Ser. No. 283,803
Int. Cl.[5] E04B 7/18
U.S. Cl. 52—72 **29 Claims**



21. A sealing gasket for use between separable components of a skylight or the like, said gasket having substantially single-point attachment to one of said components in a manner to permit at least limited deflection of said gasket, said single-point attachment being formed by coextrusion of the gasket with said one component, said gasket being of substantially tubular construction having a hollow interior for enhancing pliability and sealing function of the gasket, said gasket having multiple and separate contact sealing locations to form multiple seal areas disposed at a side of the gasket remote from the attachment point of the gasket to said one component.

4,928,446

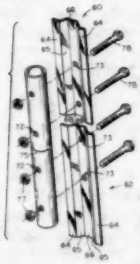
BREAK-AWAY SIGN POST AND POST GROUND ANCHOR

Walter A. Alexander, Sr., 1805 Roswell Rd., Apt. 19E, Marietta, Ga. 30062

Continuation-in-part of Ser. No. 156,220, Feb. 16, 1988, which is a continuation-in-part of Ser. No. 123,709, Nov. 23, 1987. This application Dec. 14, 1988, Ser. No. 286,031

Int. Cl.[5] F16B *7/00*; E02D *5/74*

U.S. Cl. 52—98 **7 Claims**



1. A break-away post comprising two elongated channels of generally U-shaped construction each having a web from which two side walls divergently extend, a stud having a tubular wall of a selected thickness with an outside cylindrical surface sized to abut the inside surfaces of said two side walls and web of said channels and with a central portion of said stud having a tubular wall thickness less than said selected thickness to provide an area of structural weakness for allowing said stud to fracture omnidirectionally, and means for mounting said stud to said two channels with said channels aligned in mutually spaced relation, with said stud central portion located between said two channels and with said stud cylindrical outside surface abutting said two side walls and web of each of said channels.

4,928,447

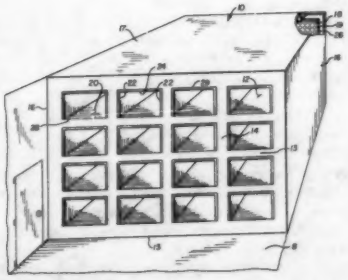
CRYPT INSULATION PANEL AND METHOD OF INSTALLATION

Walter Stoecklein, 293B, R.D. #2, Rte. 910, Cheswick, Pa. 15024

Filed Nov. 28, 1988, Ser. No. 276,948

Int. Cl.[5] E04A *13/00*

U.S. Cl. 52—136 **28 Claims**



7. The improvement of claim 6, wherein said polyurethane comprises at least 90% closed cells.

4,928,448

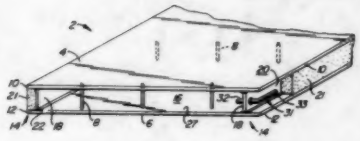
THERMALLY INSULATING WINDOW AND METHOD OF FORMING

Bradley L. Phillip, San Francisco, Calif., assignor to Enhanced Insulations, Inc., Shaker Heights, Ohio

Filed May 2, 1988, Ser. No. 188,820

Int. Cl.[5] E06B *7/12*

U.S. Cl. 52—174 **37 Claims**



1. A thermally insulating window comprising:

an enclosure including first and second spaced-apart window panes and an edge seal sealably connecting the window panes to define a sealed insulating region between the window panes; and

a first gas filling the insulation region at a first pressure of about 100–200 torr to about 10^{-3} to 10^{-4} torr, which is sufficiently low to substantially eliminate convective heat flow through the insulating region but not so low as to substantially reduce conductive heat flow through the insulating region, the thermal conductivity of the first gas at said first pressure being substantially less than that of air.

4,928,449

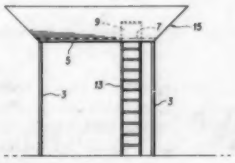
ELEVATED SUNDECK

Eugene Anderson, 3293 Stockland Rd., Battle Creek, Mich. 49017

Filed Jul. 12, 1989, Ser. No. 378,770

Int. Cl.[5] E04H *1/12*

U.S. Cl. 52—194 **9 Claims**



7. An improved deck comprising:

(a) a decking having a deck surface; and

(b) at least one side wall adjacent to said decking, said side wall being angularly related to said deck surface and covered with a reflective covering.

4,928,450

PANEL SYSTEM FOR WINDOWS

F. Wayne Rutledge, 716 Acadia Drive Southeast, Calgary, Alberta, Canada (T2J 0C3)

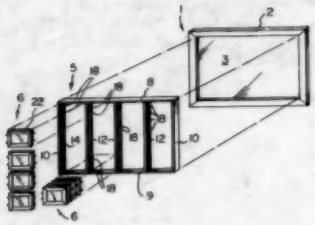
Filed Aug. 30, 1988, Ser. No. 238,179

Int. Cl.[5] E06B *3/26*

U.S. Cl. 52—202 **10 Claims**

1. In combination, a window having a window frame, and an accessory light-controlling panel system comprising a pair of first track means mounted adjacent the window frame in parallel relationship with the window and frame; longitudinally and transversely extending slot means in opposing, parallel surfaces of said first track means; and a plurality of discrete light-con-

trolling panel means for slidable mounting in said slot means, whereby each said panel means can be independently moved



longitudinally and transversely with respect to said first track means to block selected portions of the window opening.

4,928,451

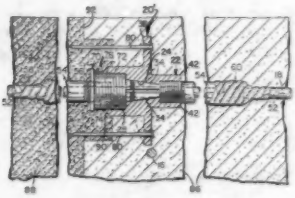
ANCHOR APPARATUS FOR A TENDON IN PRESTRESSED CONCRETE SLAB

Gordon H. Reigstad, North St. Paul; A. Norris Breivik, Forest Lake, and Hanley S. Reigstad, Sunburg, all of Minn., assignors to Tech Research, Inc., St. Paul, Minn.

Division of Ser. No. 916,151, Oct. 7, 1986, Pat. No. 4,743,354, which is a continuation-in-part of Ser. No. 870,654, May 30, 1986, abandoned, which is a continuation-in-part of Ser. No. 785,333, Oct. 7, 1985, abandoned. This application Nov. 18, 1988, Ser. No. 273,197

Int. Cl.[5] E04C *5/08*

U.S. Cl. 52—223 L **2 Claims**



1. A device for holding a tendon in a stressed condition in a prestressed concrete slab, said tendon having a corrosion resistant covering, said covering being incomplete in a region around where said device holds said tendon, said device comprising:

wedges;

an anchor body having a central passage for receiving said tendon, said passage having a longitudinal centerline, said passage having an inlet section, an outlet section and a central section therebetween, said central section including a conical portion for receiving and providing a seat for said wedges, said inlet section having a smaller transverse dimension through the longitudinal centerline than said outlet section, said body further including means for resisting longitudinal movement with respect to said slab;

a first conduit having first and second end portions;

means for sealingly attaching said first end portion of said first conduit to said inlet section of said anchor body, said attaching means including said inlet section having a first threaded portion and said first end portion of said first conduit being threaded to mate with said first threaded portion;

first means for sealing said second end portion of said first conduit to said covering on said tendon to enclose one end of said region where said corrosion resistant covering is incomplete; and

means for sealingly closing said outlet section of said anchor body with respect to the other end of said region of said tendon where said corrosion resistant covering is incomplete, said closing means including said outlet section having a second threaded portion, said closing means also including a second conduit like said first conduit and second sealing means like said first sealing means, said closing means further including a reducer having a first threaded end mating with said second threaded portion of the outlet section of said anchor body and a second threaded end for mating with a first threaded end portion of said second conduit, said reducer having a central passage for receiving said tendon therethrough, said covering of said tendon, said reducer, said second conduit and said second sealing means enclosing said other end of said region of said tendon where said corrosion resisting covering is incomplete thereby protecting said entire region from outside corrosive fluids.

4,928,452

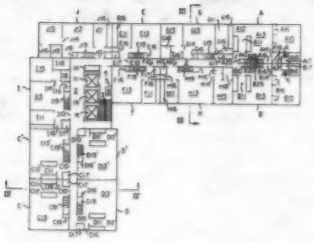
BUILDING STRUCTURE

Charles H. Sacks, c/o Hallandale Rehabilitation Center, 2400 E. Hallandale Beach Blvd., Hallandale, Fla. 33009

Filed Mar. 28, 1989, Ser. No. 329,767

Int. Cl.[5] E04H *1/00*

U.S. Cl. 52—236.3 **20 Claims**



1. A multi-story building structure, comprising at least one pair of levels, each pair of levels including one sleeping level, one living level and one public corridor on said living level, duplex apartments each having at least one room on said sleeping level and at least one room on said living level of a respective pair of levels, and an elevator system including two elevators, each of said elevators having a respective stop disposed at each one of said public corridors and each of said elevators skipping said sleeping levels.

4,928,453

APPARATUS FOR TRANSFERRING ELONGATED SAMPLE TUBE HOLDERS TO AND FROM WORKSTATIONS

Michael A. Ferkany, Southfield, Mich., assignor to Biomedical Devices Company, Inc., Farmington, Mich.

Filed Dec. 29, 1987, Ser. No. 138,875

Int. Cl.[5] B65B *57/04, 61/00, 3/04*

U.S. Cl. 53—67 **38 Claims**

1. A device for transferring sample tubes arranged in elongated sample holders to and from consecutive workstations positioned along a transfer path, comprising:

entrance support means for supplying said sample holders to said transfer path;

exit support means for receiving said sample holders from said transfer path;

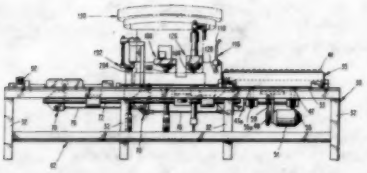
workstation support means extending between said entrance support means and said exit support means for supporting

said sample holder during transfer to and from said workstations, said workstation support means defining an entrance area for receiving said sample holders from said entrance support means;

guide means disposed along said workstation support means for guiding said sample holders within said workstation support means toward said exit support means;

first transfer means disposed along said entrance support means for transferring each of said sample holders individually into said entrance area of said workstation support means;

second transfer means disposed along said workstation support means for engaging said sample holders to transfer said sample holders a predetermined amount along said workstation support means;



control means for coordinating actuation of said first transfer means, said second transfer means and said workstations to ensure smooth operation of said device,

said control means including first monitoring means for monitoring the presence of a sample holder in said entrance area,

first signal means operatively connected to said first monitoring means for actuating said second transfer means when a sample holder is present in said entrance area; and

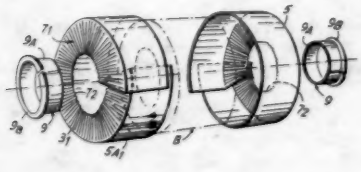
second signal means operatively connected to said first monitoring means for actuating said second transfer means a first predetermined number of times when a sample holder is not present in said entrance area.

4,928,454

PROCESS FOR WRAPPING RIBBON TYPE METAL COILS

Luigi Bertolotti, S. Giovanni Valdarno, Italy, assignor to Bertolotti S.p.A., Genoa and Nuova Italsider S.p.A., Valdarno, both of, Italy

Division of Ser. No. 124,415, Nov. 23, 1987, Pat. No. 4,793,485, which is a continuation of Ser. No. 836,317, Mar. 5, 1986, abandoned. This application Nov. 4, 1988, Ser. No. 267,171
Claims priority, application Italy, Mar. 15, 1985, 9362 A/85; Dec. 20, 1985, 9549 A/85
Int. Cl.[5] B65B *25/24*
U.S. Cl. 53—409 **4 Claims**



1. A process of wrapping a coil of strip metal which comprises the steps of:

cutting two strips of metal having the same width as said strip metal and a combined length slightly greater than two times the outer circumference of said coil,

bending each of said strips at right angles about a longitudinal fold line to form first and second longitudinally extending wings disposed at right angles to one another, said first wing having a width slightly greater than half the width of said coil,

forming in said second wing a series of triangular pleats with the apexes of said pleats at said fold line to reduce the length of a free edge of said second wing while bending said first wing into an arc having a radius substantially equal to the radius of the outer periphery of said coil,

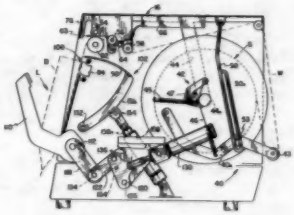
assembling said bent and pleated strips on said coil with said pleated second wing of one strip overlying one end of said coil said pleated second wing of another strip overlying an opposite end of said coil, with said arcuately curved first wings of said strips overlapping one another and covering the outer periphery of said coil, and said coil being annular with a cental hole having an inner periphery, and said second wings of said strips having a width which is approximately equal to the radial distance between the inner periphery and the outer periphery of said coil.

4,928,455

PACKAGING MACHINE AND METHOD

John L. Gereby, Rocky River; Eric P. Gifford, Orange; Rick S. Wehrmann, Hudson, and William M. Easter, Solon, all of Ohio, assignors to Automated Packaging Systems, Inc., Twinsburg, Ohio

Continuation of Ser. No. 127,255, Dec. 1, 1987, abandoned. This application Apr. 28, 1989, Ser. No. 346,376
Int. Cl.[5] B65B *43/26*
U.S. Cl. 53—570 **8 Claims**



1. A table top packaging machine, comprising:

(a) a machine housing including a raisable top cover;

(b) a first guide structure carried by said top cover and second guide structure carried by a frame portion in said machine which together define a path of travel for a web of interconnected bag-like containers, when said cover is closed;

(c) web advancing means operative to periodically advance said web along said path to successively position each of said containers at a loading station;

(d) means for expanding a container positioned at said loading station, comprising:

(i) an electrically operated blower including a shutter controlled outlet;

(ii) a nozzle position near said loading station for directing air towards a mouth of said container;

(iii) conduit means for connecting said shutter controlled outlet with said nozzle;

(e) container separating means for severing a loaded container from said web comprising:

(i) a blade-like member movable into and out of a portion of said web path intermediate a heat sealing assembly and said web advancing means in order to sever said container along a line of weakness;

(ii) fluid pressure actuating means for effecting reciprocal movement in said blade-like member;

(f) said heat sealing assembly comprising:

(i) a clamping bar movable towards and away from a heat sealing unit;

(ii) a toggle mechanism for driving said clamping bar towards and away from said heat sealing unit and operative to apply an increasing clamping force to said clamping bar as said bar approaches said sealing unit;

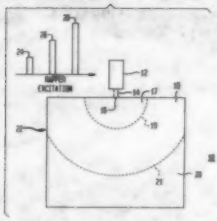
(g) an electrically powered air compressor forming part of said packaging machine for providing a source of pressurized air for said fluid pressure actuator.

4,928,456

PROCESS FOR RAPPING OF ELECTROSTATIC PRECIPITATOR SURFACES

Henry J. Del Gatto, New Egypt, and John E. Trainor, Willingboro, both of N.J., assignors to NWL Transformers, Bordentown, N.J.

Filed Jun. 16, 1988, Ser. No. 207,778
Int. Cl.[5] B03C *3/76*
U.S. Cl. 55—12 **8 Claims**
MICROFICHE APPENDIX INCLUDED
(10 Microfiche, 616 Pages)



1. A method for removing precipitate from a collecting surface of an electrostatic precipitator having at least one rapper for applying a level of mechanical energy of variable time duration to an application point on a collecting surface in accordance with a level of electrical excitation applied to the rapper, comprising the steps of:

(a) applying mechanical energy to the application point through a single rap of a rapper, said single rap being of predetermined intensity, and

(b) further applying mechanical energy of variable time duration to the application point through discrete raps of a rapper wherein the time duration is controlled by applying a predetermined number of full half cycle pulses followed by a single cycle of reduced conduction of electrical power and wherein the intensity of the applied mechanical energy is increased from one application of energy to another to prevent dispersion of precipitate removed from regions of the collecting surface relatively near the application point while removing precipitate from regions relatively distant from the application point.

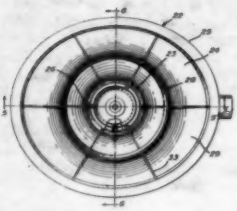
4,928,457

WEED CUTTER

Guy Laperle, 27 Clifton Street, Sawyerville, Canada (J0B 3A0)

Filed Mar. 29, 1988, Ser. No. 174,907
Int. Cl.[5] A01D *34/67*
U.S. Cl. 56—12.7 **13 Claims**

1. A vegetation cutting device of the rotary type comprising a drive shaft, a support for said drive shaft, a cutting assembly rotatably connected to said drive shaft, said cutting assembly including a cutting element to cut vegetation when rotating in a cutting plane substantially normal to the axis of said drive shaft, a skirt fixed to said support and overlying said cutting assembly, said skirt having a peripheral edge lying in a plane generally parallel to said cutting plane, said cutting element having a radially outer portion protruding radially outwardly from said peripheral edge of said skirt when rotating, the peripheral edge of said skirt defining a first zone at a minimum radial distance from said drive shaft axis and a second zone at a maximum radial distance from said drive shaft axis, the radial



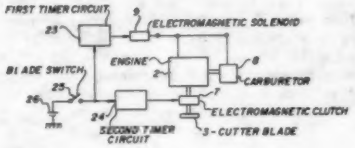
distance of said edge from said drive shaft axis progressively increasing from said first zone to said second zone in the rotation direction of said cutting assembly.

4,928,458

ENGINE CONTROL DEVICE FOR MOWER

Fumio Muroya, and Yoshiaki Kotani, both of Saitama, Japan, assignors to Honda Giken Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 19, 1989, Ser. No. 367,582
Claims priority, application Japan, Jun. 20, 1988, 63-81494[U]
Int. Cl.[5] A01D *34/64, 34/82;* F02D *9/02, 11/10*
U.S. Cl. 56—11.8 **4 Claims**



1. A control device in a mower in which an engine output is transmitted to a cutter blade through a coupling of a clutch for performing mowing, the control device comprising: a blade engagement switch for sending a drive signal for engaging the cutter blade; a first control means for electrically increasing a degree of opening of a throttle valve of the engine; a second control means for electrically performing coupling and decoupling of the clutch; a first timer circuit for actuating the first control means for a predetermined period upon closure of the blade engagement switch; and a second timer circuit for actuating the second control means to provide coupling of the clutch at a predetermined timing within the predetermined period after closure of the blade engagement switch.

4,928,459

AIR SYSTEM FOR A COTTON HARVESTER

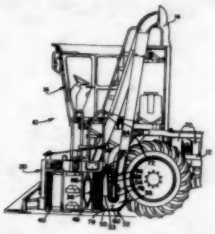
Guy N. Thedford, Naperville, and Gary L. Wells, Downers Grover, both of Ill., assignors to J. I. Case Company, Racine, Wis.

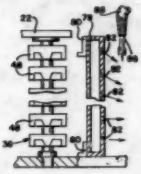
Filed Mar. 27, 1989, Ser. No. 329,001
Int. Cl.[5] A01D *46/10*
U.S. Cl. 56—13.3 **12 Claims**

4. An air system for a cotton harvester adapted for movement over a field of cotton plants, said cotton harvester including a cotton harvester unit comprising a housing assembly, spindle means rotatably mounted on said housing assembly for removing cotton from the cotton plants, and doffer means rotatably mounted on said housing assembly for doffing cotton from the spindle means, an upright compartment structure supported by the housing assembly into which doffed cotton is received, said structure defining an upper area and an opening

arranged toward a lower area thereof through which cotton passes, duct means leading upwardly from said opening for directing cotton toward a cotton receptacle, said air system comprising:

first operative means connected to a source of pressurized air for discharging a stream of air upwardly into said duct means in a manner creating a vacuum at said opening sufficient to draw cotton therethrough; and





second operative means arranged toward an upper area of said compartment structure and connected to said source of pressurized air for directing a column of air downwardly into said compartment structure to entrain the doffed cotton within the air column and inhibit an accumulation of doffed cotton in an upper area of the compartment structure.

4,928,460

SELF-PROPELLING FIELD CHOPPING MACHINE

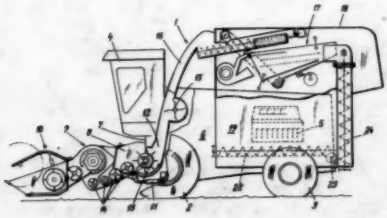
Dirk Bruer; Franz Heidjann, and Heinrich Hemker, all of Harsewinkel, Fed. Rep. of Germany, assignors to Claas OHG, Harsewinkel, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 888,793, Jul. 21, 1986, abandoned. This application Apr. 29, 1988, Ser. No. 187,947

Claims priority, application Fed. Rep. of Germany, Sep. 21, 1985, 3533773

Int. Cl.[5] A01D *41/02*; A01F *12/60*

U.S. Cl. 56—14.6 **10 Claims**



1. A self-propelling field chopping machine, comprising a chassis; a front cutting mechanism; a transporting channel provided with a throwing out pipe having a downstream end; a rotatable conveyor arranged upstream of said transporting channel and formed as a rotatable conveyor drum provided with paddles; a threshing device arranged between said cutting mechanism and said rotatable conveyor drum and operating in accordance with an axial flow system; a wind sieve device located at said end of said throwing out pipe so that a grain-chaff mixture without straw is supplied to said wind sieve device; and a grain tank located under said wind sieve device and removably mounted on said chassis so that with said grain tank

the self-propelling field chopping machine can be used as a self-propelling harvester thresher and without said grain tank it can be used as the self-propelling chopping machine.

4,928,461

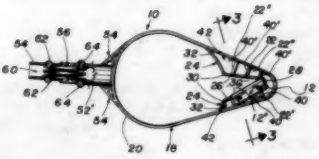
FRUIT PICKING ASSEMBLY

John S. King, 16500 SW. 102 Ct., Miami, Fla. 33157

Filed Sep. 15, 1988, Ser. No. 244,837

Int. Cl.[5] A01D *46/24*

U.S. Cl. 56—339 **15 Claims**



1. A picking head and support assembly for a fruit containing bag designed to be secured to an elongated pole, said assembly comprising:

a. a support frame having a continuous, substantially elongated and curvilinear configuration including a nose portion formed on and defining a distal end thereof and a base portion formed on and defining a proximal end thereof,

b. said support frame structured to support the fruit containing bag thereon and being disposed in supporting engagement with an open peripheral portion of the bag; said base portion having a greater transverse dimension than said nose portion and being of sufficiently large dimension to allow a piece of fruit being cut to pass therethrough,

c. a guide means mounted on said nose portion and disposed and configured for guiding a stem of the fruit into a cutting portion,

d. said guide means comprising two elongated guide rails located interiorly of said support frame and extending along at least a majority of the length of said nose portion, said guide rails defining an elongated channel having an open end communicating directly with said base portion and a closed end oppositely disposed to said open end, said channel disposed at an angular, off-set relation to a central longitudinal axis of said nose portion,

e. a cutting blade connected to said support frame in an angular orientation to the length of said channel and including a cutting edge thereof extending angularly along at least a majority of the length of said channel, and

f. a retaining structure mounted on said guide means in retaining engagement with the peripheral portion of the bag and being disposed and configured to maintain the bag in an operative fruit-retaining position.

4,928,462

AGRICULTURAL BALER WITH SIX STROKE FEEDER MECHANISM

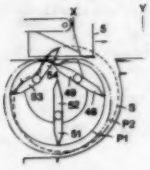
Christiaan A. C. Lippens, Sint-Laureins, and Adrianus Naaktgeboren, Zedelgem, both of Belgium, assignors to Ford New Holland, Inc., New Holland, Pa.

Filed May 18, 1989, Ser. No. 354,180

Claims priority, application United Kingdom, May 24, 1988, 8812270

Int. Cl.[5] A01D *39/00*

U.S. Cl. 56—341 **6 Claims**



1. In an agricultural baler including:

a bale case having an inlet opening formed therein;

a feeder duct communicating with the bale case through the inlet opening for charges of crop material to be transferred from the feeder duct into the bale case;

a plunger reciprocable within the bale case to compress successive charges of crop material received from the feeder duct to form a bale;

feeder means operable within the feeder duct to accumulate a charge of crop material therein and then stuff that accumulated charge into the bale case; the feeder means including a plurality of rotatable tine bars a first of which carries a set of packer tines and a second of which carries a set of stuffer tines; the packer tines carried by the first tine bar having outer ends following, during operation, a first path of movement and the stuffer tines carried on the second tine bar having outer ends following, during operation, a second path of movement which is offset relative to the first path of movement; and

an improvement wherein the feeder means comprises a third tine bar carrying a set of combination packer and stuffer tines, whereby the feeder means subjects the crop material in the feeder duct to two stuffing strokes in transferring a charge of crop material from the feeder duct to the bale case, the combination packer and stuffer tines carried on the third tine bar having outer ends following a third path of movement which is offset relative to both the first and second paths of movement.

4,928,463

YARN BRAKE MECHANISM FOR A TWO-FOR-ONE TEXTILE YARN TWISTING MACHINE SPINDLE ASSEMBLY

Johannes Frentzel-Beyme, Mönchen-Gladbach, Fed. Rep. of Germany, assignor to Palitex Project Company GmbH, Krefeld, Fed. Rep. of Germany

Filed Sep. 20, 1988, Ser. No. 246,879

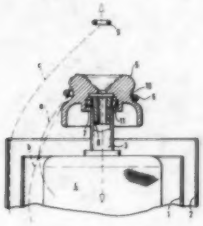
Claims priority, application Fed. Rep. of Germany, Sep. 30, 1987, 3732904

Int. Cl.[5] D01H *7/86, 13/10;* **B65H** *59/06, 59/36*

U.S. Cl. 57—58.86 **14 Claims**

1. In a two-for-one textile yarn twisting machine spindle assembly including at least two supply packages of yarn mounted concentrically therein one above the other for simultaneous and separate withdrawal of yarns therefrom in a common direction, and a yarn inlet tube mounted concentrically with said yarn supply packages and having an upper end portion extending above said yarn supply packages for simultaneously receiving therein the yarns withdrawn from said supply packages; the improvement therein of a yarn brake mechanism for applying substantially uniform tension to the yarns moving from said supply packages to said yarn inlet tube without one yarn affecting the tension on the other yarn and comprising:

slip-on member means including bearing means for being rotatably mounted on said upper end portion of said yarn inlet tube for rotation relative thereto by frictional engagement of the yarns moving into said yarn inlet tube from said supply packages so that the rotational speed of



said slip-on member means is commensurate with the rotational speed of the yarns, said slip-on member comprising a rotationally symmetrical member having a necked-down portion; and

brake ring means for being floatingly received and mounted in said necked-down portion of said slip-on member means and for receiving the separate yarns between said brake ring means and said slip-on member means as the yarns move from said supply packages to said yarn inlet tube.

4,928,464

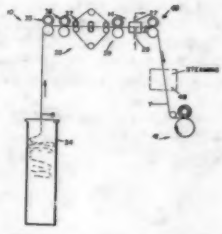
YARN PRODUCED BY SPINNING WITH VACUUM

Elbert F. Morrison, Clarksville, Va., assignor to Burlington Industries, Inc., Greensboro, N.C.

Continuation of Ser. No. 680,510, Dec. 11, 1984, Pat. No. 4,719,744, and a continuation-in-part of Ser. No. 386,078, Jun. 7, 1982, Pat. No. 4,507,913. This application Apr. 21, 1987, Ser. No. 41,835

Int. Cl.[5] D02G *3/36, 3/34;* **D01H** *1/12, 5/28*

U.S. Cl. 57—224 **4 Claims**



1. A method of spinning yarn having surface effects and simulating the appearance of a fully twisted yarn, comprising the steps of:

(a) acting upon a sliver or roving to separate free ends of surface fibers having short staple length of between about 0.5–6 inches;

(b) transporting the fibers in a linear direction A at a substantially constant linear speed; and

(c) while transporting the fibers, rotating the free ends to provide a core formed by approximately 20–40% of the fibers of the sliver or roving, the core having a limited amount of real twist, and approximately 80–60% of the

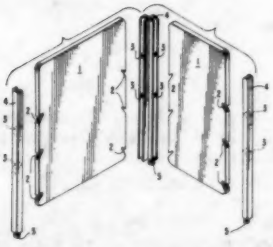
fibers wrapped about the core, to provide surface effects, the yarn simulating the appearance of a fully twisted yarn.

4,928,465

MODULAR PRIVACY SCREEN ASSEMBLIES

Juan M. Del Castillo Von Haucke, Salamanca No. 34, 20 Piso, Mexico, Mexico

Filed Apr. 7, 1989, Ser. No. 334,528
Int. Cl.[5] E04B *2/74*
U.S. Cl. 52—239 **1 Claim**



1. Modular privacy screen assemblies comprising vertical stiles and plane panels, said vertical stiles including at least one longitudinally extending channel within which and extending horizontally and transversely thereof are two vertically spaced supporting elements, the upper supporting element being vertically spaced below the top of the stile with which it is associated and the lower supporting member being vertically spaced from and above the bottom of the stile with which it is associated, each of said plane panels having a left side and a right side, a top margin and a bottom margin, each of said plane panel sides being formed with three vertically spaced, inwardly and upwardly extending slots, the lower slot on each panel side being relatively close to its corresponding panel bottom, and the upper slot being spaced below the panel top for a greater distance than the distance between the uppermost slot and the second or middle slot, the distance between the second or middle slot and the lowermost slot being equal to the distance between the uppermost slot and the middle slot, whereby when the uppermost slots and the middle slots are engaged with the two supporting members associated with the stiles the panel will be in its lowermost position, and when the middle slots and the lowermost slots are associated with the two supporting members in each stile the panel will be in its uppermost position and the panel top will be level.

4,928,466

RETAINING AND ANCHORING HARDWARE FOR A CERAMIC FIBER MODULE

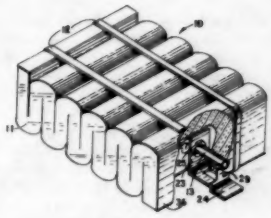
Michael E. Alexander, 3616 Ashbury, Ponca City, Okla. 74601

Filed Jun. 5, 1989, Ser. No. 361,318
Int. Cl.[5] E04B *1/38*
U.S. Cl. 52—509 **6 Claims**

1. An insulation support apparatus for use in attaching blanket insulation to a surface comprising:

(a) an elongated cylindrical tubular member means having an inner diameter, an outer diameter and having a first and second end portions, said first end portion having its outer diameter equal to or less than the inner diameter of said tubular means so that said first end portion can slidably fit into a second end portion of a preceding cylindrical tubular member;

(b) a bracket means having a first and second end, means at said first end for attachment to said surface, an opening means at said second end for receiving said elongated cylindrical tubular member means; and



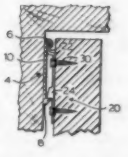
(c) means for retaining said elongated tubular member means at a selected location along its length when received by said opening means.

4,928,467

PANEL FASTENER

Roy A. Hintsa, 198 National Drive, Woodbridge, Ontario, Canada (L4L 3E4)

Filed May 13, 1988, Ser. No. 193,584
Int. Cl.[5] E04B *1/38*
U.S. Cl. 52—511 **12 Claims**



1. A wall panel hanging system comprising a top hanging track to be horizontally secured to a wall and clips for securement to a panel, said top hanging track having a forwardly facing shank receiving portion at the upper edge thereof and a forwardly extending shoulder therebelow, said track further including a flange area for receiving fasteners; each clip including a top shank sized for close, free sliding reception in said shank receiving portion and an integral clip shoulder spaced below said top shank and cooperating with said forwardly extending shoulder when said top shank is generally fully received in said top hanging track whereafter said clip shoulder may be brought into support engagement with said forwardly facing shoulder with said top shank generally fully received in said top hanging track, said clip shoulder acting as the only surface of said clip opposing movement of said clip shoulder past said forwardly facing shoulder when said clip shoulder is in support engagement with said forwardly facing shoulder.

4,928,468

BUILDING PANEL MODULE

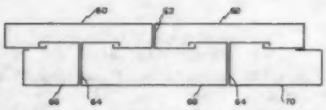
Edward H. Phillips, 3601 Bay Shore Rd., Fort Collins, Colo. 80524

Filed Dec. 5, 1988, Ser. No. 279,895
Int. Cl.[5] E04B *2/62*
U.S. Cl. 52—574 **20 Claims**

1. A generally rectangular building panel module for defining at least a portion of a building wall, floor, or ceiling when a plurality of modules are assembled, the module comprising:

(a) at least three rectangular metallic plates arranged in parallel to define a hollow, generally rectangular panel module having a pair of spaced, substantially parallel

outer faces, at least one of the plates including inwardly extending legs and being symmetrical relative to a longitudinal centerline, at least two of the plates including at least one inwardly extending leg that is joined to an inwardly extending leg of an adjacent plate on the same face of the module to define a longitudinally extending I-beam element having a central web member and a pair of spaced, substantially parallel transverse end members extending outwardly from longitudinally extending edges of the central web member, the end members including an outer end member defining a part of a panel module outer face and an inner end member spaced inwardly from each of the panel module faces, the inner end members each defining first baffle members positioned within the interior of the panel module, the I-beam element providing longitudinal stiffness to the panel module to withstand longitudinally applied compression loads and to provide transverse strength to the panel module to withstand tranversely applied bending loads;



(b) a discontinuous intermediate inner wall positioned between the outer faces, the inner wall defined by respective ones of the first baffle members and by transversely offset second baffle members carried by at least one end leg of each of the plates plates, the first and second baffle members being substantially planar and positioned relative to each other in overlapping relationship and spaced from each other in a transverse direction of the module to prevent direct transmission therebetween of heat and sound and to prevent unimpeded passage through the module of ballistic projectiles that penetrate one face of the module, and thereby provide resistance to passage through the module of ballistic projectiles heat, and sound; and

(c) end cap means extending across respective longitudinally spaced ends of the panel module for interconnecting respective ones of the plates to provide a unitary panel module that can be handled and transported as a unit for assembly with correspondingly-shaped panel modules for defining a portion of a structural, load bearing building surface.

4,928,469

MODULAR CONSTRUCTION BLOCK

Marcel Dorier, "La Vinette" Saint-Denis d'Authou, 28480 Thiron-Gardais, France

Continuation of Ser. No. 87,188, Aug. 20, 1987, abandoned. This application Jan. 30, 1989, Ser. No. 304,859

Claims priority, application France, Aug. 26, 1986, 86 12065

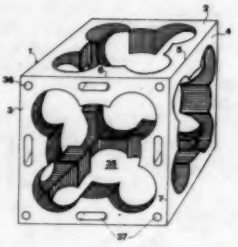
Int. Cl.[5] E04C *1/00*

U.S. Cl. 52—607 **14 Claims**

1. A modular block for making constructions, said block comprising a body having:

at least three contiguous plane faces such that perpendiculars to any two of each of said contiguous faces form a rectangular frame of reference; and

three groups of laterally intersecting, parallel cylindrical hollows, each hollow opening out into a respective one of said contiguous faces and each group of said hollows comprising at least two of said hollows, the generator line of each of the hollows in a group being perpendicular to the face into which said hollow opens out, each cylindrical hollow within a group including two lines in common with another cylindrical hollow within the group at the lateral intersection therebetween, the outline of each group of hollows forming an opening of corresponding outline along the respective face of the body, and wherein a section of each cylindrical hollow forms a partially closed curved surface for receiving a cylinder of comple-



mentary shape to the hollow and preventing the cylinder, when received therein, from moving radially within the cylindrical hollow receiving said cylinder.

4,928,470

ASSEMBLY PIECES FOR METALLIC CARPENTRY SECTIONS

Maria I. Perez, Gral. Margallo, 24, Entresuelo; Escalera 28020, Spain

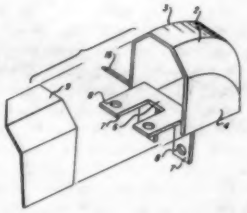
Filed Feb. 26, 1987, Ser. No. 19,145

Claims priority, application Spain, Feb. 27, 1986, 292590

The portion of the term of this patent subsequent to Jan. 29, 2006, has been disclaimed.

Int. Cl.[5] E04C *2/38*

U.S. Cl. 56—656 **4 Claims**



1. An assembly piece for connecting metallic carpentry sections having ends provided with radial runners, said assembly piece comprising:

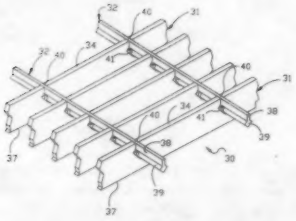
an angle piece having two parallel and superimposed quadrants, each said quadrant defined by diverging radial lines and a connecting arc, said angle piece further having an arced middle portion which is curved parallel to said connecting arcs and which connects said connecting arcs;

a flat angled bar defined by two perpendicular portions, said angled bar being attached between said quadrants with a respective said perpendicular portion extending from between said quadrants parallel to a respective plane including superimposed said radial lines; each said perpendicular portion having two radially directed arms separated by a radial space opening away from the other said perpendicular portion such that the two said arms of each said perpendicular portion are received in an adjacent respective radial runner of the carpentry section, and each said arm including an aperture therein through which a screw passing through the carpentry section is received to hold the carpentry section to the angle piece.

4,928,471
GRATING CONSTRUCTION

David W. Bartley, Canton, Ohio, assignor to Ohio Gratings, Inc., Canton, Ohio

Filed Jun. 8, 1988, Ser. No. 203,265
Int. Cl.[5] E04C 2/42
U.S. Cl. 52—664 5 Claims



1. An improved grating construction of the type intended for closing or flooring an opening, said grating including:

(a) a plurality of spaced, parallel, elongated aluminum bearing bars, each having a plurality of spaced cutouts formed along a longitudinal top edge thereof, said cutouts each comprising a generally rectangular-shaped upper portion and an outwardly flared lower portion;

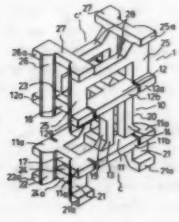
(b) a plurality of spaced, parallel, elongated aluminum crossbars, each having a generally rectangular-shaped upper portion and an outwardly flared lower portion complementary in shape and size to the upper and lower portions, respectively, of the bearing bar cutouts, said crossbar being loosely slideably engaged within a plurality of transversely aligned bearing bar cutouts; and

(c) deformations formed on certain of the outwardly flared lower portions of the aluminum crossbars adjacent to the aluminum bearing bars for locking the bearing bars with the crossbars so that an upper surface of the rectangular portions of the crossbars are generally flush with the longitudinal top edges of the bearing bars.

4,928,472
CHAIR FOR REINFORCEMENT ROD

Jyh-Chin Chang, 38, Kuang-Ming St., Pei-Chen Li, Lo-Tung, Y:-Lan Hsien, Taiwan

Filed Apr. 24, 1989, Ser. No. 342,992
Int. Cl.[5] E04C 5/16
U.S. Cl. 52—678 5 Claims



1. A chair for concrete reinforcing rods comprising:

a body having a planar rectangular transverse top frame member and a planar rectangular transverse bottom frame member, each of said top and bottom frame members having a front side, a rear side, a left side and a right side, and two pairs of first connecting members placed between and connected to intermediate parts of said top and bottom frame members;

said body further having two pairs of first leg members respectively extending upward from the corners of said top frame member, and two pairs of second leg members respectively extending downward from the corners of said bottom frame member,

said first connecting members and top and bottom frame members confining a left and right channel-like first support seat adjacent said left and right sides of said top and bottom frame members,

said first leg members and said top frame member confining a channel-like second support seat,

said second leg members and said bottom frame member confining a channel-like third support seat,

said second support seat being operative and said left and right sides of said bottom frame member serving as an additional lower level supporting seat when said second leg members are placed downward, said third support seat being operative and said left and right sides of said top frame member serving as an additional lower level supporting seat when said first leg members are placed downward, said first and second leg members being different in length so that said second and third support seats provide different supporting levels,

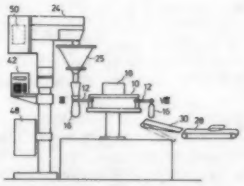
said left first support seat being operative when said right sides of said top and bottom frame members are placed downward, said right first support seat being operative when said left sides of said top and bottom frame members are placed downward,

said first connecting members having different distances from said left and right sides of said top and bottom frame members so that said left and right first support seats provide different supporting levels.

4,928,473
DEVICE FOR AUTOMATICALLY FILLING AND PACKING PREDETERMINED WEIGHT OF PRODUCT IN CONTAINERS

Takeyoshi Nagao, Kakogawa, and Toru Kohashi, Hyogo, both of Japan, assignors to Yamato Scale Company, Limited, Akashi, Japan

Filed Jun. 9, 1989, Ser. No. 364,259
Claims priority, application Japan, Jun. 20, 1988, 63-153058
Int. Cl.[5] B65B 57/02; G01G 15/00
U.S. Cl. 53—53 17 Claims



1. A device for automatically filling and packing a predetermined weight of product in containers, comprising a first rotary table including a plurality of weighing heads arranged at equal intervals around said table, each weighing head including weight detecting elements and a bag-like container holding mechanism, and a plurality of operating means disposed at first to sixth operating locations arranged in this order around said first rotary table for applying specific treatments to each weighing heads passing said locations; characterized by said operating means comprising:

container feeding means for feeding a bag-like container to said holding mechanism to be held thereby when each of said weighing heads arrives at said first operating location,

memory means for reading and storing the weight of said container detected by said weight detecting elements

when each weighing head arrives at said second operating location,

product feeding means for filling said container with a predetermined target weight of product when each weighing head arrives at said third operating location,

arithmetic means for subtracting the stored weight of said container from the weight of the filled container detected by said weight detecting elements to calculate the net weight of said product for comparing said net weight with a predetermined allowable range to judge the acceptability thereof and for storing the result of judgement when each weighing head arrives at said fourth operating location,

feed control means for adjusting the amount of feed of said product feeding means based upon the deviation of said net weight from said target weight while each weighing head is at said fourth operating location,

sealing means for sealing the opening of said container to complete a packed product when each weighing head arrives at said fifth operating location, and

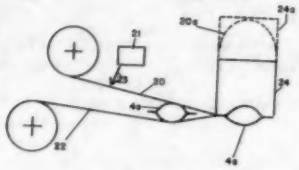
delivery means for discharging said packed product from said holding mechanism and, if not acceptable, removing said product based upon said stored result of judgement when each said weighing head arrives at said sixth operating location.

4,928,474

OXYGEN-BARRIER RETORT POUCH

Henry G. Schirmer, Spartanburg, S.C., assignor to W. R. Grace & Co.-Conn., Duncan, S.C.

Filed Sep. 21, 1988, Ser. No. 247,202
Int. Cl.[5] B65B *55/06, 11/58*
U.S. Cl. 53—425 **9 Claims**



1. A method of making an oxygen barrier retorted container comprising:

(a) providing a container,

(b) filling the container with a product sensitive to spoilage from oxygen content,

(c) sealing the filled container,

(d) retorting the filled container under moisture at a sterilizing temperature for a sufficient time to sterilize the product,

(e) removing excess moisture from the retorted, filled container outside and cooling the retorted, filled container at about room temperature, and

(f) enclosing the retorted, filled container with a separate oxygen barrier material.

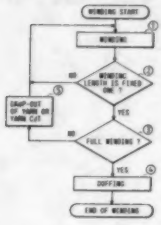
4,928,475

FIXED LENGTH WINDING METHOD IN A TWO-FOR-ONE TWISTER

Isamu Matsui; Masao Uehara, both of Kyoto; Shinji Noshi, Yawata, and Tsukasa Kawarabeshi, Kyoto, all of Japan, assignors to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

Filed Aug. 16, 1989, Ser. No. 394,624
Claims priority, application Japan, Aug. 25, 1988, 63-210956; Feb. 24, 1989, 1-44364
Int. Cl.[5] D01H *1/38, 7/86, 9/14*
U.S. Cl. 57—264 **9 Claims**

1. A fixed length winding method in a two-for-one twister, the method comprising winding a yarn having a fixed length by a winder to form a package, once cutting a yarn and thereafter further winding the same amount of yarn on said package to form a maximum yarn-supply package capable of being



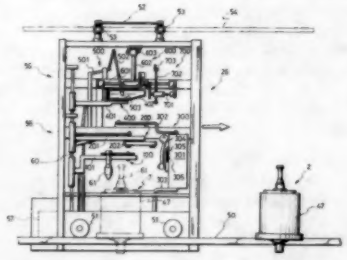
mounted on the two-for-one twister, and mounting said yarn-supply package on said two-for-one twister to produce a plurality of twist-yarn packages having a fixed length of yarn from a single yarn-supply package.

4,928,476

TWO-FOR-ONE TWISTING MACHINE

Hiroo Otoshima, Shiga; Hiroshi Tsuji, Joyo; Shigeki Mori, Ohtsu, and Yoshihiro Nishimura, Nagaokakyo, all of Japan, assignors to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

Filed Jul. 18, 1988, Ser. No. 220,733
Claims priority, application Japan, Jul. 22, 1987, 62-182602
Int. Cl.[5] D01H *9/10, 9/18;* **B65H** *67/04*
U.S. Cl. 57—268 **18 Claims**



1. A two-for-one twisting machine comprising:

a plurality of two-for-one twisting units arranged in rows, said two-for-one twisting units each having a twisting machine, at least one feed package and a take-up device,

a travelling member adapted to travel in front of said plural two-for-one twisting units, said travelling member being provided with a main rod, a feed package changing device operable with the two-for-one twisting units, and a take-up package changing device operable with the two-for-one twisting units,

wherein said feed package changing device comprises a tensor moving device, comprising:

a first support beam adapted to move up and down along the main rod the first support beam having a top end,

a first arm supported slidable vertically relative to the main rod and rotatable on the main rod in the directions toward and away from the two-for-one twisting units, the first arm positioned below the first support beam and in a direction substantially perpendicular thereto,

a first lever pivotally supported on the top end of the first arm at the intermediate portion thereof,

a link arm pivotally supported with and connecting the top

end of said first support beam and one end of said first lever,

a driving means for driving the first arm,

a rocking lever supported rockably by the first lever,

two opposed chucks rockably supported by the first lever, the two opposed chucks being adapted to hold a tensor therebetween when the first arm is turned toward the two-for-one twisting units and to release a tensor held therebetween when the first arm is turned away from the two-for-one twisting units, and

an opening/closing pin fixed to the rocking lever.

4,928,477

PROCESS FOR FORMING A FIBER OR YARN CONTACTED ELEMENT OF A TEXTILE MACHINE

Siegfried Kalitzki, Würselen-Bardenberg; Josef Peters, Geilenkirchen-Grot, both of Fed. Rep. of Germany, and Gottfried Schürmann, JG Schinveld, Netherlands, assignors to W. Schlafhorst & Co., Fed. Rep. of Germany

Filed Mar. 30, 1989, Ser. No. 331,638

Claims priority, application Fed. Rep. of Germany, Mar. 30, 1988, 3810775

Int. Cl.[5] D01H *7/882*

U.S. Cl. 57—416 **7 Claims**

1. A fiber or yarn contacted element of a textile machine having a plurality of layers at the fiber or yarn contacting surface thereof, comprising:

an inner body portion of steel;

a boronized layer formed on said body portion;

an alpha-iron layer formed on said boronized layer; and

a nickel coating layer, said alpha-iron layer being disposed intermediate said nickel coating layer and said boronized layer.

4,928,478

WATER AND STEAM INJECTION IN COGENERATION SYSTEM

Chris E. Maslak, Ballston Lake, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jul. 22, 1985, Ser. No. 757,177

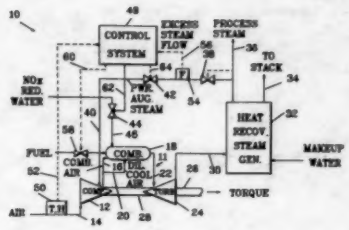
Int. Cl.[5] F02C *7/00*

U.S. Cl. 60—39.05 **6 Claims**

6. A method for controlling a cogeneration system of a type including a gas turbine and a heat recovery steam generator, said gas turbine including an air compressor, a combustor and a turbine effective, in combination, for producing a torque, and a quantity of hot gasses, said heat recovery steam generator being effective to absorb heat energy from said quantity of hot gasses for producing steam, the method comprising:

injecting at least one of a steam and a water into a combustion zone of said combustor at a flow effective for producing a predetermined level of reduction in a NOx in said quantity of hot gasses;

adding at least part of an excess steam from said heat recovery steam generator to compressed air from said air compressor whereby power output of said gas turbine is augmented; and



reducing said at least one of a steam and a water in a proportion to said excess steam added to said compressed air effective to maintain said predetermined level of reduction in a NOx in said quantity of hot gasses.

4,928,479

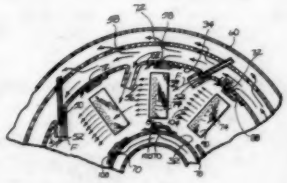
ANNULAR COMBUSTOR WITH TANGENTIAL COOLING AIR INJECTION

Jack R. Shekleton; Colin Rodgers, both of San Diego, and John P. Archibald, LaJolla, all of Calif., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Dec. 28, 1987, Ser. No. 138,342

Int. Cl.[5] F02C *3/08*

U.S. Cl. 60—39.36 **9 Claims**



1. A gas turbine comprising:

a rotor including compressor blades and turbine blades;

an inlet adjacent one side of said compressor blades;

a diffuser adjacent the other side of said compressor blades;

a nozzle adjacent said turbine blades for directing hot gasses at said turbine blades to cause rotation of said rotor;

an annular combustor having radially inner and outer walls connected by a generally radially extending wall about said rotor and having an outlet connected to said nozzle and a primary combustion annulus defined by said walls remote from said outlet, a plurality of fuel injectors to said primary combustion annulus and being substantially equally angular spaced therearound and configured to inject fuel into said primary combustion annulus in a nominally tangential direction; and

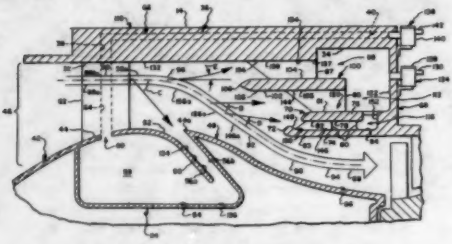
means associated with each of said walls for injecting a film-like stream of cooling air into said primary combustion annulus in a generally tangential direction.

4,928,480

SEPARATOR HAVING MULTIPLE PARTICLE EXTRACTION PASSAGEWAYS

Wayne R. Oliver, Peabody, Mass.; Roy E. Moyer, Cincinnati, Ohio, and Dennis R. Girardin, Peabody, Mass., assignors to General Electric Company, Lynn, Mass.

Filed Mar. 4, 1988, Ser. No. 164,371
Int. Cl.[5] F07C *7/052*
U.S. Cl. 60—39.092 **33 Claims**



1. A particle separator system for a gas turbine engine including interior walls defining an engine intake passageway including a throat for receiving engine intake air and an annular compressor inlet passageway in flow communication with the engine intake passageway, said system comprising:

a main particle separator including an inlet passageway disposed downstream of said throat and in flow communication with the engine intake passageway for receiving a portion of foreign particles carried by the air entering the engine intake passageway, said inlet passageway of said main particle separator being provided by a pair of interior walls of the engine arranged so as to face one another, and

an auxiliary particle separator associated with one interior wall of the engine including means defining an auxiliary passageway having an inlet downstream of said throat and in flow communication with said engine intake passageway for receiving an additional portion of foreign particles carried by the air entering the engine intake passageway so that the main and auxiliary particle separators provide the engine with an enhanced capacity for separating foreign particles from the engine intake air.

4,928,481

STAGED LOW NOX PREMIX GAS TURBINE COMBUSTOR

Narendra D. Joshi, Phoenix, Ariz., and Frederick E. Moreno, Los Altos, Calif., assignors to PruTech II, San Jose, Calif.

Filed Jul. 13, 1988, Ser. No. 218,252
Int. Cl.[5] F23R *3/32*
U.S. Cl. 60—737 **20 Claims**

1. In a staged low NOx lean premix hot wall method for combusting fuel in a gas turbine combustor, the steps of:

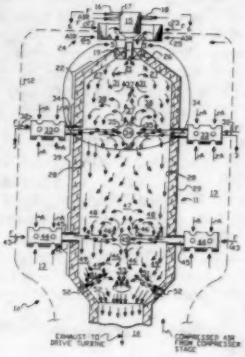
inducting a first lean premixture of fuel and compressed air into a first stage of a combustion chamber;

igniting and combusting the inducted first premixture of fuel and air within the first stage of the combustion chamber to produce a stream of combustion products exiting the first stage of the combustion chamber;

inducting a plurality of streams of a second premixture of fuel and compressed air into a second stage of the combustion chamber downstream of the first stage from generally opposite directions and colliding the streams in an impact region within the stream of combustion products exiting the first stage of the combustion chamber to produce a divergent intensely turbulent flow emanating from the impact region to define a Stirred Reactor region within the second stage of the combustion chamber;

igniting and burning the second lean premixture of fuel and compressed air in the second stage of the hot wall combustion chamber to produce combustion products exiting the second stage of the combustion chamber; and

maintaining the interior wall surface of the combustion



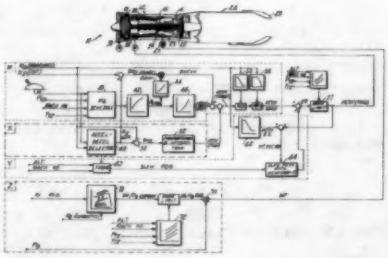
chamber which faces the combustion flame at a temperature near the flame temperature within the combustor, whereby high stability low NOx operation is obtained over a wide range of turndown heat release values.

4,928,482

CONTROL OF HIGH COMPRESSOR VANES AND FUEL FOR A GAS TURBINE ENGINE

Robert R. Pollak, North Palm Beach, and Juan A. Marcos, Jupiter, both of Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed Sep. 20, 1988, Ser. No. 246,728
Int. Cl.[5] F02C *9/54*
U.S. Cl. 60—39.161 **7 Claims**



1. A control for controlling a gas turbine engine for powering aircraft during rapid accelerations and decelerations operating modes, said gas turbine engine having a first spool comprising a high pressure compressor and a first turbine driving said high pressure compressor and a second spool comprising a low pressure compressor and a second turbine driving said low pressure compressor and said first spool and said second spool being solely aerodynamically coupled, fuel metering means for regulating the flow of fuel to said engine, and variable vanes for said high pressure compressor for regulating the airflow thereto, means for controlling said engine to operate on a predetermined high pressure compressor steady state operating curve and having the speed of said first spool and said second spool being at a predetermined relationship, a power lever, said control including means responsive to the position of said power level fo. establishing a thrust value for adjusting

said engine to accelerate and decelerate rapidly, said control having additional control means responsive to engine and aircraft operating variables for generating a first signal requesting a desired corrected low compressor speed (N_1), means responsive to said first signal and a preselected fixed corrected high pressure compressor speed (N_2) for generating a desired airflow from said variable vanes, means responsive too said power lever for selecting a constant N_2, means responsive to the difference of said selected constant N_2 and measured N_2 including a proportional and integral controller for adjusting said variable vanes to accelerate or decelerate said engine to said value established by said power lever, and means responsive to a timed signal to adjust said variable vanes as a function of said desired corrected low pressure speed operating in cooperation with said means for adjusting said fuel metering means to return said engine to operate on said high pressure compressor steady state operating curve.

4,928,483

AIR TAP AND ENGINE MOUNT FOR A TURBOJET ENGINE

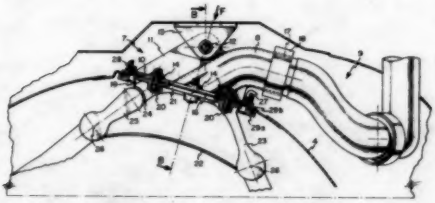
Bernard LeFort, Ponthierry; Jean-Pierre Maulat, Saint Maur, and Guy R. Bachomoff, Corbeil Essonnes, all of France, assignors to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation (SNECMA), Evry Cedex, France

Filed Jun. 19, 1989, Ser. No. 367,627

Claims priority, application France, Jun. 30, 1988, 88 08802

Int. Cl.[5] F02K *3/04*

U.S. Cl. 60—226.1 **9 Claims**



1. A device for tapping a portion of the air from a bypass duct of fan-type turbojet engine, the bypass duct being defined between a primary engine casing and a secondary casing, and for attaching the turbojet engine to an aircraft structure comprising:

(a) a base plate extending over an opening defined by the secondary casing, the base plate defining an air tapping orifice;

(b) means connecting the base plate to an air tapping tube such that the orifice communicates with the interior of the tube;

(c) first attaching means attaching the base plate to the aircraft structure; and,

(d) second attaching means attaching the base plate to the primary engine casing.

4,928,484

NONLINEAR MULTIVARIABLE CONTROL SYSTEM

Joseph L. Peczkowski, Granger, Ind., assignor to Allied-Signal Inc., Morristown, N.J.

Filed Dec. 20, 1988, Ser. No. 286,690

Int. Cl.[5] F02K *3/00*

U.S. Cl. 60—240 **11 Claims**

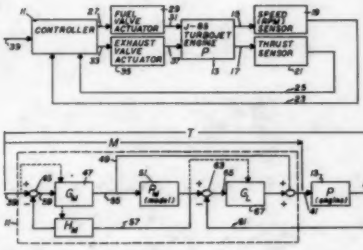
1. A multivariable control system for an engine or like plant which is responsive to input request signals for effecting plant operation in accordance with those input request signals comprising:

input means for receiving the request signals and providing output signals in response thereto;

a model of the plant for simulating plant performance and providing outputs indicative of such performance in response to signals from the input means;

first feedback means for returning the plant model output signals to the input means;

the input means including means for comparing the input request signals and the returned output signals, and for providing error output signals to the model of the plant to enable the plant model to more nearly exhibit the request operation;



means for supplying the input means output signals to the plant;

second feedback means for comparing a plant performance with the corresponding performance of the model of the plant and for applying corrective signals to the plant to modify plant performance in response to discrepancies between the plant performance and the performance of the model of the plant.

4,928,485

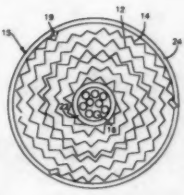
METALLIC CORE MEMBER FOR CATALYTIC CONVERTER AND CATALYTIC CONVERTER CONTAINING SAME

William A. Whittenberger, Garrettsville, Ohio, assignor to W. R. Grace & Co.,-Conn., New York, N.Y.

Filed Jun. 6, 1989, Ser. No. 362,089

Int. Cl.[5] F01N *3/28*

U.S. Cl. 60—299 **16 Claims**



1. A core member useful in a catalytic converter comprising:

(a) a strip of corrugated nonnesting thin metal foil having a given length and a given width, said strip being folded to provide portions of about equal length; and

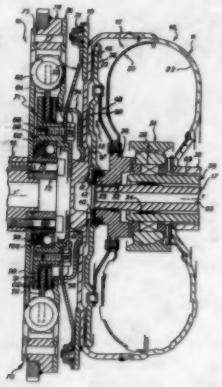
(b) a wire secured along the fold line of said folded strip.

4,928,486

VARIABLE-FORCE CLAMPING MECHANISM BETWEEN TORQUE-VARIATION DAMPING FLYWHEEL AND TORQUE CONVERTER

Dominique Despres, Clichy, France, assignor to Valeo, Paris, France

Filed Jul. 27, 1988, Ser. No. 224,988
Claims priority, application France, Jul. 29, 1987, 87 10750
Int. Cl.[5] F16H *45/02*; F16F *15/12*
U.S. Cl. 60—338 8 Claims



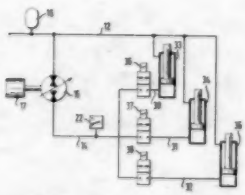
1. A fluid coupling device, including a rotatable coupling means comprising, in series, a torsion damping flywheel and a fluid coupling device assembled together by means of a rotatable output portion of said damping flywheel, said damping flywheel including at least one friction means and wherein a clamping means, adapted so as in operation to modify the clamping torque of said friction means, is interposed between a casing of the fluid coupling device and said friction means.

4,928,487

CONTROL APPARATUS FOR DOUBLE ACTING HYDRAULIC CYLINDER UNITS

Heinrich Nikolaus, Hamburg, Fed. Rep. of Germany, assignor to Mannesmann Rexroth GmbH, Lohr/Main, Fed. Rep. of Germany

Continuation of Ser. No. 487,615, Apr. 22, 1983, abandoned. This application Jun. 5, 1985, Ser. No. 741,216
Claims priority, application Fed. Rep. of Germany, May 10, 1982, 3217527
Int. Cl.[5] F16D *31/02*
U.S. Cl. 60—414 12 Claims



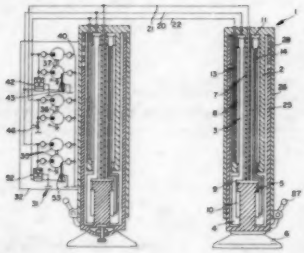
1. A hydraulic system for operating a load comprising a double acting hydraulic cylinder unit supplied with fluid from a pressure line, a constant pressure source continuously supplying fluid under a constant pressure to said pressure line including means for recovering energy in both directions of piston movement, said pressure line being connected to one cylinder space of said cylinder unit directly for actuating the piston thereof in a first direction and a conduit means connecting said pressure line to the other cylinder space, a hydraulic machine interposed in said conduit means and having a variable flow for controlling the volume of pressurized medium flowing between said other cylinder space and said pressure line, said machine being operable in either a pump mode to increase the pressure in said other cylinder space to move said piston in a direction opposite to said first direction or operable as motor when said piston moves in said first direction to generate energy when functioning in the motor mode.

4,928,488

HYDRAULICALLY-OPERATED SUPPORT DEVICE FOR SEMITRAILERS

Walter Hunger, Otto-Nagler-Strasse 13, 87 Wuerzburg, Fed. Rep. of Germany

Filed Feb. 13, 1989, Ser. No. 309,133
Int. Cl.[5] F16D *31/02*
U.S. Cl. 60—480 11 Claims



1. A hydraulically-operated support device for semitrailers, comprising:

at least one hydraulic cylinder semitrailer support comprising an extending piston and an extending cylinder defining a first annular space therebetween and a load-raising piston and a load-raising cylinder defining a second annular space therebetween, the load-raising cylinder formed at a bottom end of the extending cylinder; and

a pump subassembly for generating and controlling the hydraulic operating pressure comprising three independently-operable pumps:

an extending pump communicating with and acting on the extending piston,

a load-raising pump communicating with and acting on the load-raising piston, and

a retracting pump communicating with and acting on the first and second annular spaces; wherein the transmission ratio between the load-raising pump and the load-raising piston is substantially lower than the transmission ratio between the extending pump and the extending piston.

4,928,489

SUPERCHARGING PRESSURE CONTROL METHOD FOR TURBOCHARGED INTERNAL COMBUSTION ENGINES

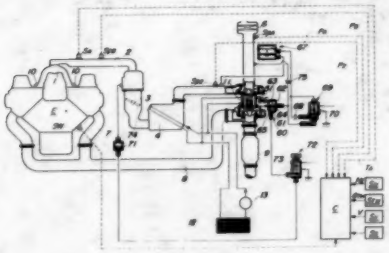
Kazuo Inoue; Noriyuki Kishi, and Eitetsu Akiyama, all of Wako, Japan, assignors to Honda Giken Kogyo K.K., Tokyo, Japan

Filed Dec. 22, 1988, Ser. No. 288,299

Claims priority, application Japan, Dec. 29, 1987, 62-334196; Mar. 18, 1988, 63-65322

Int. Cl.[5] F02B *37/12*

U.S. Cl. 60—602 6 Claims



1. A method of controlling supercharging pressure in an internal combustion engine by means of a basic control amount dependent upon operation conditions of the engine, comprising the steps of:

(1) detecting a rate of change of the supercharging pressure; and

(2) when the supercharging pressure is in a transient state where it is increasing, correcting said basic control amount in response to the detected rate of change of the supercharging pressure, in a manner such that the rate of increase of the supercharging pressure is decreased as the detected rate of change of the supercharging pressure increases so as to make the supercharging pressure increase at a predetermined rate.

4,928,490

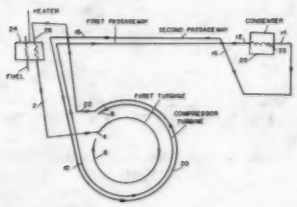
TURBINE HOUSING POWER SYSTEM WITH GEAR HOUSING

Demos Papastavros, 2429 NE. 184th Ter., N. Miami Beach, Fla. 33160

Filed Jul. 24, 1989, Ser. No. 384,408

Int. Cl.[5] F01K *19/04*

U.S. Cl. 60—670 11 Claims



1. A turbine housing power system contining a turbine housing which has a fluid inlet and a fluid outlet and further comprising:

a power tubine located inside said turbine housing having a fluid inlet and fluid outlet, said power turbine being operatively connected to a first shaft,

a compressor turbine located inside said turbine housing having a fluid inlet and fluid outlet, said compressor turbine being operatively connected to a second shaft, said second shaft having a hollow core inside which said first shaft is located therefore allowing said second shaft to rotate independently around said first shaft,

a first fluid conduit means operatively connecting said inlet of said turbine housing to said inlet of said power turbine, said first fluid conduit is designed to pass outside the rotor blades of said power turbine, "tapering in", decreasing in size from said inlet of said turbine housing to said inlet of said power turbine,

a means for allowing working fluid to flow from said outlet of said power turbine to the inlet of said compressor turbine,

a second fluid conduit means operatively connecting said outlet of said compressor turbine to said outlet of said turbine housing, said second fluid conduit is designed to pass outside the rotor blades of said compressor turbine, "tapering out", increasing in size, from said outlet of said compressor turbine to said outlet of said turbine housing,

a third fluid conduit means having a heat exchange relationship with said second fluid conduit means, said third fluid conduit containing condensed working fluid from an outside condensing source, the working fluid in said third fluid conduit absorbs the heat energy from the hot exhaust fluid flowing in said second fluid conduit through a heat exchange relationship, preheating the working fluid in said third fluid conduit before it reaches an outside heating source which adds addtional heat energy to the system.

4,928,491

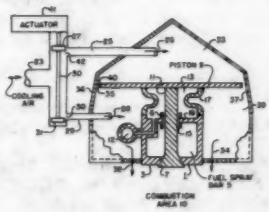
FUEL SUPPLY DEVICE FOR SUPPLYING FUEL TO AN ENGINE COMBUSTOR

Mitchell H. Lindsay, Palm City, and Walter B. Kerr, W. Palm Beach, both of Fla., assignors to United States of America as represented by the Secretary of Air Force, Washington, D.C.

Filed Jun. 29, 1988, Ser. No. 213,198

Int. Cl.[5] F02C *1/00*

U.S. Cl. 60—734 13 Claims



1. A variable flow rate fuel supply device for supplying fuel to an engine combustor (10) comprising:

(a) fuel metering means (1) having a fuel valve means (3, 7) for controlling the flow rate of fuel to said combustor;

(b) piston means (9) for dividing a first cooling fluid chamber (33) from a second cooling fluid chamber (39);

(c) coupling means (11) for coupling said piston means to said fuel valve means (3, 7); and

(d) cooling fluid supply means (23, 25, 29, 41, 42, 50, 27, 31, 30) in communication with said first and second cooling fluid chamber for producing a first pressure differential across said piston means (9) for actuating said fuel valve means in a first direction, and for producing a second pressure differential across said piston means for actuating said valve means in a second direction opposite said first direction, to control the flow rate of said fuel through said fuel metering means and into said engine combustor; and

(e) means for positioning (12) said fuel metering means (1) within said second cooling air chamber (39), enabling said cooling air supply means to both cool said fuel metering

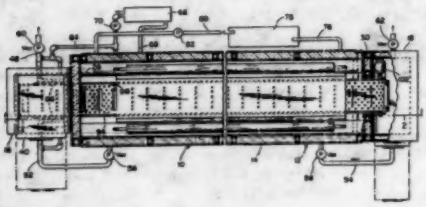
means and control the fuel supply rate of fuel supplied by said fuel metering means to said combustor.

4,928,492

CRYOGENIC PRODUCT TREATING APPARATUS

Henry H. Howard, 611 N. Franklin St., Modesto, Calif. 95351

Filed Dec. 8, 1988, Ser. No. 281,282
Int. Cl.[5] F25D *13/06*
U.S. Cl. 62—63 **15 Claims**



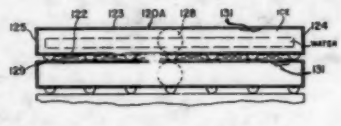
1. A method of exterior surfacing cleansing and outer boundary layer cooling a product, said method including providing a closed vessel having a cooled bath liquid therein and wherein said bath liquid has a boiling point temperature considerably below ambient temperature and the temperature of said bath liquid is below said boiling point temperature, introducing said product into said pressure vessel, from the exterior thereof, through mechanical vapor lock structure and placing said product in said bath liquid with said product at an initial temperature appreciably above said boiling point temperature, allowing said product to remain in said bath liquid only for a time interval sufficient to cause the outer boundary layer, only, of said product to be appreciably cooled below said boiling point temperature, withdrawing said product from said bath liquid and, after a predetermined time, removing said product from said vessel through vapor lock structure, said predetermined time period being only of sufficient duration to allow residual heat in said product inwardly of said outer boundary layer and above the boiling point temperature of said bath liquid to migrate, by conduction, to the outer surfaces of said product for vaporizing any remaining bath liquid on said outer surfaces.

4,928,493

ICE BUILDING, CHILLED WATER SYSTEM AND METHOD

Thomas A. Gilbertson, Moraga; Michael R. Meyers, Sonoma, and Bruce Kinneberg, Martinez, all of Calif., assignors to Reaction Thermal Systems, Inc., Napa, Calif.

Continuation-in-part of Ser. No. 284,890, Dec. 6, 1988, which is a continuation-in-part of Ser. No. 11,617, Feb. 6, 1987, abandoned. This application Feb. 14, 1989, Ser. No. 311,215
Int. Cl.[5] F25D *3/00*
U.S. Cl. 62—185 **6 Claims**



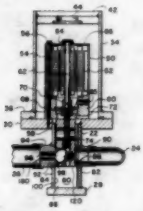
1. In a chill water system, in combination:
structural means defining a vessel for containing a volume of a first liquid characterized by a first freezing temperature substantially lower than water;
a multiplicity of ice encapsulating units disposed in said vessel and occupying a major portion of the volume thereof, each of said ice encapsulating units comprising sealed container means being filled with water and having a volume of cholesterol therein serving as an ice nucleating agent for said water; and
a liquid chilling system operatively associated with said vessel for cooling said first liquid in said vessel to a temperature above said first freezing temperature and below the freezing temperature of water.

4,928,494

INCREMENTAL ELECTRICALLY ACTUATED VALVE

Paul R. Glamm, La Crosse, Wis., assignor to American Standard Inc., New York, N.Y.

Filed Dec. 20, 1988, Ser. No. 286,683
Int. Cl.[5] F25B *41/04*; F16K *31/04*
U.S. Cl. 62—222 **19 Claims**



1. A refrigeration system for controllably circulating refrigerant in closed loop connection comprised of:
an evaporator for gasifying refrigerant;
a compressor in flow connection with said evaporator for receiving and compressing said gasified refrigerant;
a condenser in flow connection with said compressor for receiving and liquefying said refrigerant;
a variable flow rate expansion valve in flow connection with said condenser for receiving said liquefied refrigerant and controllably expanding said refrigerant, said valve in flow connection with said evaporator for directing said expanded refrigerant to said evaporator, said valve comprised of:
a valve body defining an internal metering chamber having a substantially planar outlet surface, said valve body having a first wall with an inlet aperture for permitting fluid flow into said metering chamber and a second wall including a planar outlet surface with an outlet aperture for permitting fluid flow from said metering chamber;
a metering piston disposed in said metering chamber in sliding engagement with said planar outlet surface, said metering piston having a metering orifice; and
means for incrementally moving said metering piston in said metering chamber normal to said outlet aperture, said metering piston moving means fixed in said internal metering chamber.

4,928,495

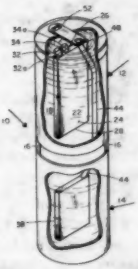
SELF COOLING AND SELF HEATING CONTAINER

Israel Siegel, 2980 Point East Dr., Apt. D-612, North Miami Beach, Fla. 33160

Filed Jun. 22, 1989, Ser. No. 369,828
Int. Cl.[5] F25D *5/00*
U.S. Cl. 62—4 **14 Claims**

1. A temperature changing device consisting of a chamber, a liquid in said chamber, at least a partial air-vacuum in said chamber to lower the boiling temperature of said liquid, a second chamber, a dessicant in said second chamber, said dessicant having an affinity for vapors generated by said liquid, a communication between said vapors and said dessicant to obtain a sorption of said vapors by said dessicant, means to reversibly close said communication to obtain an unlimited storage of the temperature changing potential of said temperature changing device, a container associated with said dessi-

cant chamber, said dessicant chamber and said container spatially arranged so that the dessicant chamber is present inside



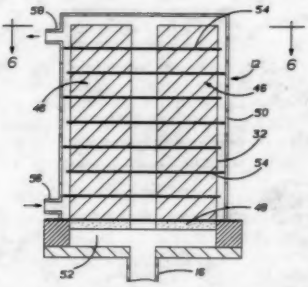
said container, water inside said container, said water and said dessicant chamber spatially arranged so that dessicant chamber is immersed in said water.

4,928,496

HYDROGEN HEAT PUMP

W. Edward Wallace; H. Kevin Smith; W. Bryan Lynch; Raymond S. Craig, all of Pittsburgh, and Fiaz Pourarian, Verona, all of Pa., assignors to Advanced Materials Corporation, Pittsburgh, Pa.

Filed Apr. 14, 1989, Ser. No. 337,960
Int. Cl.[5] F17C *11/00*
U.S. Cl. 62—46.2 **24 Claims**



1. A bed of hydride forming material for use in a heat pump, operating by transferring hydrogen between two reaction vessels, each vessel employing at least one bed, said bed containing a higher temperature more stable metal hydride forming material in one reaction vessel, and said bed containing a lower temperature less stable metal hydride forming material in the other reaction vessel, each of said beds comprising:

a heat conducting metal tube closed at one end and open at its other end;

a plurality of heat conducting metal discs having an outer periphery conforming to the inside diameter of said tube;

a plurality of layers of powdered metal hydride forming material;

said metal discs being pressed into said tube with alternate layers of powdered metal hydride forming material sandwiched between the discs;

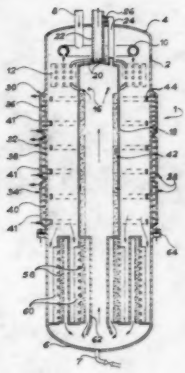
said bed allowing the flow of hydrogen gas into and out of the open end of said tube for absorption and desorption of gas by the layers of metal hydride forming material.

4,928,497

COLD TRAP FOR THE PURIFICATION OF A LIQUID METAL HAVING SEPARATE TRAPPING ZONES

Christian Latge, Aix en Provence, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Nov. 30, 1988, Ser. No. 278,032
Claims priority, application France, Dec. 3, 1987, 87 16786
Int. Cl.[5] G21C *19/30*
U.S. Cl. 62—55.5 **9 Claims**



1. Cold trap for purifying a liquid metal containing oxygen and hydrogen in solution, said cold trap comprising a liquid metal circulation enclosure (**1**), a supply pipe (**8**) for introducing the liquid metal to be purified into enclosure (**1**), a distributor (**10**) for distributing the liquid metal on the enclosure periphery, a central passage (**18**) defining for the liquid metal a hairpin-like path between an annular zone of the dropping of said metal and a central raising zone with a view to the discharge thereof, cooling means (**30, 32, 34**) located outside enclosure (**1**) and downstream of distributor (**10**) in order to create a cooling zone (**28**) for the liquid metal to be purified, at least one oxide retention element (**58**) downstream of the cooling means and a discharge pipe (**22**) for discharging the purified liquid metal, characterized in that said cold trap further comprises structures (**44**) for the attachment of hydrides, said attachment structures being located within the enclosure (**1**) and level with external cooling means (**30, 32, 34**) as well as a thermal insulating layer (**42**) placed on the wall of said passage (**18**), said insulating layer (**42**) having the function of limiting the heat exchange on the wall of said passage (**18**).

4,928,498

METHOD AND DEVICE FOR COMPRESSION OF GASES

Ewald Gossler, 73 Traunsteinstrasse, A-4810 Gmunden, Austria

Continuation of Ser. No. 927,262, Nov. 4, 1986, abandoned. This application Jan. 18, 1989, Ser. No. 298,833
Claims priority, application Austria, Nov. 8, 1985, 3224/85; Nov. 28, 1985, 3467/85
Int. Cl.[5] F25D *21/06*
U.S. Cl. 62—81 **9 Claims**

1. A method of compressing a gas in a gas compressor having a suction intake, which comprises the steps of

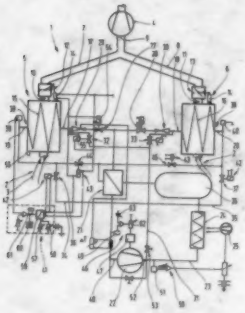
(a) cooling the gas to a temperature below 0° C. in a gas cooling zone having a freeze-dehumidifier whereby an icy condensate is precipitated on the surface of the freeze-dehumidifier,

(b) circulating a cooled refrigerant medium through the freeze-dehumidifier in a closed cycle including a suction conduit leading from the freeze-dehumidifier and a pressure conduit leading to the freeze-dehumidifier to cool the

gas in said zone to below 0° C. whereby an icy condensate is precipitated on the surface of the freeze-dehumidifier,

(c) intermittently defrosting the freeze-dehumidifier surface to remove the icy condensate therefrom while interrupting the circulation of the cooled refrigerant medium therethrough whereby cooled refrigerant medium remains standing in the freeze-dehumidifier,

(d) monitoring the pressure of the cooled refrigerant medium standing in the freeze-dehumidifier after interruption of the circulation of the cooled refrigerant medium,



(e) terminating the defrosting of the freeze-dehumidifier when the monitored pressure of the refrigerant medium exceeds a pressure corresponding to about 0° C. at the surface of the freeze-dehumidifier, and

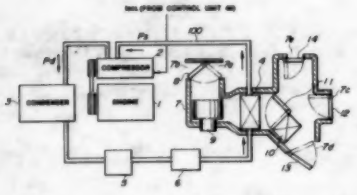
(f) monitoring the temperature of the gas in the suction intake of the compressor after it has passed through the gas cooling zone, and terminating the defrosting when the monitored gas temperature exceeds about 0° C.

4,928,499

AUTOMATIC AIR CONDITIONER SYSTEM WITH VARIABLE DISPLACEMENT COMPRESSOR FOR AUTOMOTIVE VEHICLES

Ikuo Kiminami; Hideyuki Sakamoto, and Toshimitsu Nose, all of Kanagawa, Japan, assignors to Nissan Motor Company, Limited, Japan

Filed Mar. 29, 1989, Ser. No. 330,259
Claims priority, application Japan, Mar. 31, 1988, 63-81996
Int. Cl.[5] F25D *17/04*
U.S. Cl. 62—186 **7 Claims**



1. An automatic air conditioning system for automotive vehicles with a variable displacement compressor comprising:

first detecting means for detecting an intake air temperature defined by a temperature of air flowing through an evaporator of said air conditioning system placed just behind said evaporator;

discharge changing means for essentially changing the discharge volume of refrigerant discharged from said compressor on the basis of the difference between said intake air temperature and its target value;

mode signal generating means for generating a mode signal representing whether said air conditioning system is operated in a first mode wherein conditioned air is simultaneously discharged from both of upper and lower discharge outlets or is operated in a second mode wherein conditioned air is discharged from either the upper or lower of said discharge outlets; and

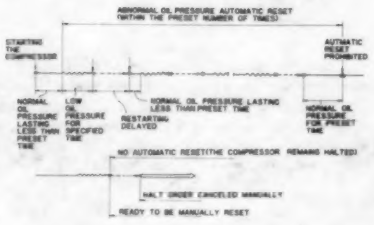
target value deriving means for deriving said target value of said intake air temperature on the basis of said mode signal in such a manner that said target value in said first mode is smaller than said target value in said second mode.

4,928,500

CONTROL DEVICE FOR FREEZER

Nobuhiro Funahashi; Toshio Yamashita, and Hiroshi Ogawa, all of Aichi, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 5, 1988, Ser. No. 190,476
Claims priority, application Japan, May 7, 1987, 62-67430
Int. Cl.[5] F25B *49/00*
U.S. Cl. 62—193 **4 Claims**


ABNORMAL OIL PRESSURE AUTOMATIC RESET WITHIN THE PRESET NUMBER OF TIMES)
STARTING THE COMPRESSOR
AUTMATIC RESET PROHIBITED
NORMAL OIL PRESSURE LASTING LESS THAN PRESET TIME
LOW OIL PRESSURE FOR SPECIFIED TIME
NORMAL OIL PRESSURE LASTING LESS THAN PRESET TIME
RESTARTING DELAYED
NORMAL OIL PRESSURE FOR PRESET TIME
NO AUTOMATIC RESETITHE COMPRESSOR REMAINS HALTED)
HALT ORDER CANCELED MANUALLY
READY TO BE MANUALLY RESET

1. A control device for a freezer, comprising:

an oil pressure sensor for sensing the oil pressure of a compressor used in said freezer and developing an oil pressure signal representative thereof;

means for comparing said oil pressure signal with a reference value, determining the oil pressure to be abnormal if said oil pressure signal is less than said reference value, and developing an abnormality signal in response to said determination;

means responsive to said abnormality signal for halting the operation of said compressor;

resetting means responsive to the halting of said compressor for restarting the operation of said compressor after a predetermined cool-off period has elapsed;

means for measuring the amount of time during continuous operation of said compressor that said abnormality signal is not developed and producing a preset time signal when said amount of time reaches a preset time; and

means responsive to said preset time signal for preventing said resetting means from restarting the operation of said compressor.

4,928,501

COLD PRESERVING CONTAINER

Kozabro Negishi, Isesaki, Japan, assignor to Sanden Corporation, Japan

Continuation of Ser. No. 324,030, Mar. 16, 1989, abandoned. This application Aug. 11, 1989, Ser. No. 393,030
Claims priority, application Japan, Mar. 17, 1988, 63-3441[U]
Int. Cl.[5] F25D *17/04*
U.S. Cl. 62—406 **31 Claims**

1. A cold preserving container comprising:

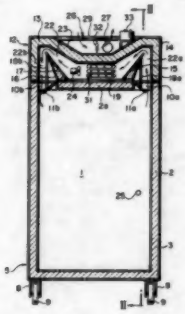
first heat insulating walls surrounding a goods container space;

an upwardly-opening, dish-like member positioned above said goods container space;

a cold accumulator positioned in said dish-like member;

cold regenerative material enclosed in said cold accumulator;

a second heat insulating wall covering and spaced above said dish-like member;



an air path positioned between said second insulating wall and said dish-like member and having air path end portions, said air path communicating at said air path end portions with said goods container space; and

a blower means for circulating air between said air path and said goods container space.

4,928,502

EQUIPMENT FOR STORING BLOOD

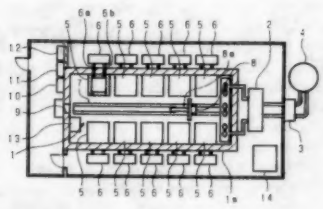
Susumu Kumada; Mikio Mori; Ryoji Nagatani, and Tadami Ano, all of Nagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 28, 1989, Ser. No. 386,116

Claims priority, application Japan, Aug. 26, 1988, 63-213210

Int. Cl.[5] F25D *11/00*

U.S. Cl. 62—440 **11 Claims**



1. An equipment for storing blood, comprising:

a keeping-cool room kept at a low temperature,

a plurality of storing cases for storing blood provided in said keeping-cool room, and

Stirling refrigerators each of which is connected to each of said storing cases and refrigerates the interior of each of them to a very low temperature.

4,928,503

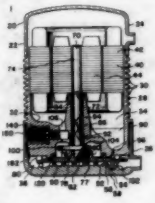
SCROLL APPARATUS WITH PRESSURE REGULATION

Delmar R. Riffe, La Crosse, Wis., assignor to American Standard Inc., New York, N.Y.

Filed Jul. 15, 1988, Ser. No. 219,127

Int. Cl.[5] F04C *18/04, 29/02, 29/10*

U.S. Cl. 62—498 **43 Claims**



1. A fluid compressor comprised of:

a first scroll member having an end plate, an upstanding involute wrap disclosed on said end plate, said first scroll member end plate further including a discharge aperture and a circular drive stub on said end plate;

a fixed second scroll member having an end plate and an upstanding involute wrap disclosed on said end plate for interleaving engagement with said upstanding involute wrap of said first scroll member;

means for driving said first scroll member, said drive means including a drive shaft having an eccentric crank portion and a crank portion for engaging said first scroll member drive stub;

a frame defining a pressure regulation chamber concentric with said drive means, said frame including a bore defining a pressure regulation passage and an aperture for flow communication from said chamber, said discharge aperture of said first scroll member end plate providing flow communication to said chamber;

a pressure regulation device for regulating fluid pressure in said pressure regulating chamber including a piston having a portion disposed in said pressure regulation passage, said pressure regulation device having a first element responsive to discharge pressure and a second element responsive to suction pressure;

an annular seal element disposed about said concentric chamber between said first scroll member end plate and said frame for sealing said chamber so that said regulated fluid pressure acts upon said first scroll end plate to bias said first scroll member toward said second scroll member; and

means for biasing said annular seal toward said first scroll member end plate.

4,928,504

ARTICULATED BRACELET WITH COMPOSITE ELEMENTS

Remigio Tuppini, Verona, Italy, assignor to Tuppini Bigiotterie S.r.l., Verona, Italy

Filed Dec. 15, 1988, Ser. No. 284,705

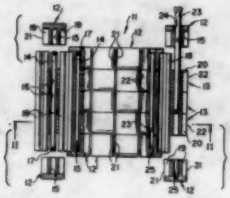
Claims priority, application Italy, Dec. 17, 1987, 23063 A/87

Int. Cl.[5] A44C *5/00*

U.S. Cl. 63—9 **7 Claims**

1. An articulated bracelet with a number of composite elements arranged with respect to one another to form a continuous longitudinal chain wherein each composite element represents a link in the chain of the bracelet, each of said composite elements comprising a number of unitary elements, each unitary element having a bore therethrough, the number of unitary elements of each composite element being positioned in side-by-side relationship with one another transversely of the longitudinal chain, each composite element having a first pin

element extending transversely through the bores of its respective unitary elements, each of the unitary elements of the composite element having a pair of opposing seats which extend parallel to the bore of the unitary element, and a number of second pin elements having articulation means for interconnecting one composite element with an adjacent composite



element whereby each second pin element is positioned within one of the opposed seats of the unitary elements of the one composite element and also positioned within one of the opposed seats of the unitary elements of the adjacent composite element, a number of composite elements being articulately connected to one another to form the links of the chain of the bracelet.

4,928,505

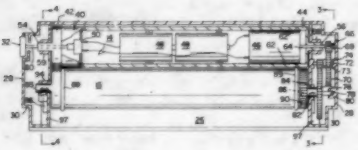
POWERED PORTABLE WRINGER

Lee R. Parks, 2520 Lodi La., San Jose, Calif. 95124, and Wiley A. Kittrell, Milpitas, Calif., assignors to Lee R. Parks, San Jose, Calif.

Filed Sep. 15, 1986, Ser. No. 907,846

Int Cl.[5] D06F *45/18*

U.S. Cl. 68—253 R **5 Claims**



3. A wringer for squeezing liquid from a wet cloth comprising:

a housing formed to support a first roller and a second roller;

said first roller being formed as a hollow cylinder and having an electric motor disposed therewithin for providing rotational power to said first and second rollers; said first roller also having a means for providing electrical energy to said motor; and wherein the casing of said electric motor is fixedly engaged to said first roller such that said casing rotates along with said first roller;

a power communication means formed within said first roller and said housing, and disposed to communicate rotational power from said electric motor to said second roller;

resilient means formed within said housing and disposed to urge said first and second rollers proximate each other;

whereby said rollers will rotate in opposite directions upon activation of said electric motor and simultaneously squeeze and draw a wet cloth through said rollers.

4,928,506

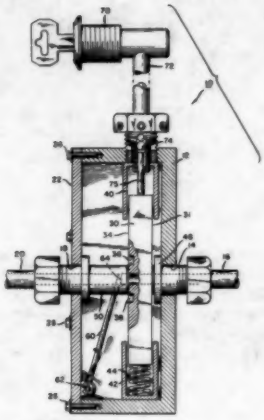
ANTI-THEFT LOCKING VALVE FOR MOTOR VEHICLES

Edmund Radziewicz, 1000 River Rd., Belmar, N.J. 07719

Filed May 11, 1989, Ser. No. 350,234

Int. Cl.[5] F16K *35/00*

U.S. Cl. 70—176 **6 Claims**



1. An anti-theft, tamper-proof lock for automobile applications for securing the fuel line or hydraulic brake line to prevent theft comprising:

a manually-operated turnkey-type tumbler lock means;

a housing disposed in the selective fluid line having an inlet port secured to an upstream fluid line in communication with a fluid reservoir, an outlet port secured to a downstream fluid line, said outlet port and said inlet port in alignment, said housing having a removable face plate, said housing having disposed therein a channeled guide having a biased mounted slide valve disposed therein, said slide valve having an aperture therethrough for selective alignment with said inlet port and said outlet port of said housing for the passage of fluid therethrough;

a communication means comprising a conduit in communication with said turnkey-type tumbler lock means and said housing, said communication means having positioned therein, a plurality of spherical bearings in communication with each other, said conduit having a pin positioned at a housing end, said pin and said spherical bearings movably engaged through the action of said turnkey-type tumbler lock means and said biased mount for said slide valve to selectively align and disalign said aperture in said slide valve with said inlet port and said outlet port for selectively opening and closing said slide valve to permit the passage of fluid therethrough;

an anti-tamper lock mechanism disposed in said housing, said anti-tamper lock mechanism comprising a biased mounted locking arm, biasly mounted to an inside of said housing and frictionally engaged with a face of said slide valve, said locking arm in alignment with vertically aligned indents in said face of said slide valve, said indents disposed laterally from said aperture in said slide valve.

4,928,507

METHODS AND APPARATUS FOR MANUFACTURING SEAMLESS TUBE

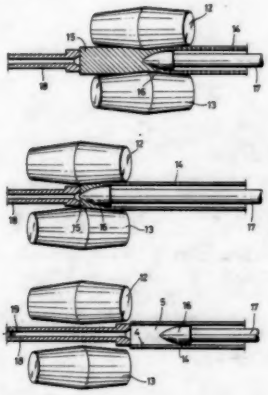
Karlhans Staat, Ratingen, and Hermann Möltner, Grevenbroich, both of Fed. Rep. of Germany, assignors to Kocks Technik GmbH & Co., Fed. Rep. of Germany

Continuation of Ser. No. 770,730, Aug. 29, 1985, abandoned. This application Dec. 23, 1987, Ser. No. 137,463

Claims priority, application Fed. Rep. of Germany, Sep. 1, 1984, 3432288

Int. Cl.[5] B21B *9/00, 19/04, 19/10*

U.S. Cl. 72—38 **7 Claims**



3. A method of manufacturing seamless tubes comprising the steps of:

(a) piercing hot ingots by means of an internal piercing tool comprising an elongated piercing rod in one of a press and a skew rolling line to form a hollow ingot;

(b) withdrawing the piercing tool from said hollow ingot;

(c) simultaneously introducing one of an inert gas and a non-oxidizing gas through a borehole in the forward end of said piercing tool into the space within the hollow ingot being vacated by the withdrawal of the piercing tool as said piercing tool is withdrawn whereby said hollow ingot is filled with said gas when said piercing tool is withdrawn.

4,928,508

METHOD OF FORMING PRELUBRICATED FINSTOCK

Gregory J. Courval, Napanee, Canada, assignor to Alcan International Limited, Canada

Filed May 27, 1987, Ser. No. 54,522

Claims priority, application Canada, May 30, 1986, 510495

Int. Cl.[5] B21D *22/00, 28/00, 53/04*

U.S. Cl. 72—42 **2 Claims**

1. A process which comprises: (a) forming a coating of water soluble lubricant on a continuous strip of aluminum alloy finstock having a thickness of 75 to 150 microns, said lubricant having a solubility of at least 50 gpl and a viscosity of at least 50 mPas, and coiling the coated strip to form a prelubricated coil having an Olsen cup rating of greater than 0.30, (b) subsequently uncoiling the prelubricated coil and passing the coated strip through a forming device to form aluminum alloy heat exchange fins, and (c) thereafter removing the lubricant from the heat exchange fins by applying an aqueous medium thereto.

4,928,509

METHOD FOR MANUFACTURING A PIPE WITH PROJECTIONS

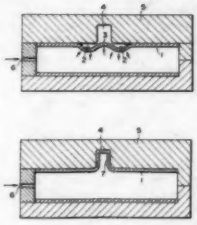
Masanobu Nakamura, Kamakura, Japan, assignor to Mitsui & Co., Ltd., Tokyo and Kokan Kako Co., Ltd., Yokohama, both of, Japan

Division of Ser. No. 139,811, Dec. 30, 1987, Pat. No. 4,840,053. This application Mar. 22, 1989, Ser. No. 327,512

Claims priority, application Japan, Jul. 29, 1987, 62-189384; Aug. 17, 1987, 62-203841

Int. Cl.[5] B21D *26/02*

U.S. Cl. 72—61 **9 Claims**



1. A method for manufacturing a pipe with a projection at a predetermined position, comprising the steps of:

(a) deforming a pipe to provide a recess close to the predetermined position, the deformation of the pipe altering an inner dimension of the pipe;

(b) placing the pipe in a bulge mold; and

(c) forcing pressurized fluid into the pipe to bulge the pipe at the predetermined position so as to form the projection.

4,928,510

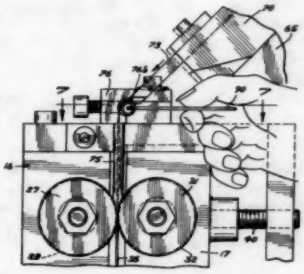
RING COILING MACHINE

Jerome Hillsted, Blaine, Minn., assignor to Merit Enterprises, Inc., Isle, Minn.

Filed Sep. 15, 1989, Ser. No. 407,591

Int. Cl.[5] B21F *37/00*

U.S. Cl. 72—131 **2 Claims**



1. An automatic ring coiling machine, having in combination actuating means mounted within a housing,

means operating said actuating means,

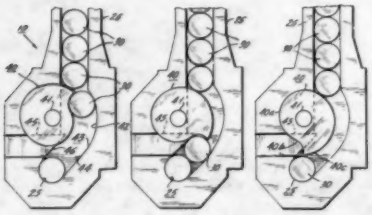
timing means in connection with said operating means,

wire advancing means,
a wire advanced by said last mentioned means,
a die member in operative association with said wire advancing means having a wire passage therethrough and a cavity therein, said passage and said cavity respectively being adapted to apply a radius to said wire and to coil the same,
means operatively associated with said die severing said coil from said wire,
said timing means comprises a pre-set operating time interval,
means in connection with said timing means extending said pre-set timing interval,
said actuating means causing the advance of said wire upon completion of a coil, and
means limiting said advance of said wire to a very short projection from said passage in said die.

4,928,511
ROTARY CUP INFEED

Ean Sirvet, Washington Township, N.J., assignor to Sequa Corporation, New York, N.Y.

Filed Dec. 13, 1988, Ser. No. 283,678
Int. Cl.[5] B21D *43/04, 43/16, 43/20*
U.S. Cl. 72—361 **29 Claims**



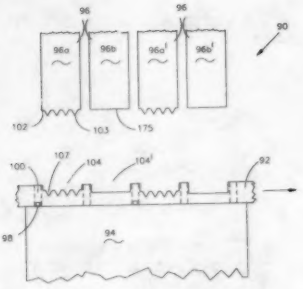
21. Feeding apparatus for moving cylindrical cups one at a time to a location where each of them dwells in a position to have its sidewall elongated by being operated upon by a reciprocating tool during its working stroke which extends through such location;
said feeding apparatus including a chute constructed to position cups as they move side-by-side in a stack, first means defining a receiving station remote from said chute, and a rotatably mounted member for separating the most downstream cup of the stack from the cups upstream of the most downstream cup and then transferring the latter from said chute to said receiving station;
said rotatably mounted member having pocket means to receive cups from said chute; and
second means for continuously rotating said member about an axis in coordination with operation of a reciprocating tool means whereby a cup is delivered to and dwells at said location for each working stroke of such reciprocating tool means.

4,928,512
DIE SET FOR THE FORMATION OF CAVITIES FOR METAL PACKAGES TO HOUSE ELECTRONIC DEVICES

James F. Rooney, Bethany, and Harvey P. Cheskis, North Haven, both of Conn., assignors to Olin Corporation, New Haven, Conn.

Filed Nov. 14, 1988, Ser. No. 270,919
Int. Cl.[5] B21D *22/06*
U.S. Cl. 72—404 **17 Claims**

9. A progressive sequence of dies for forming a cavity having a desired length, width and depth, comprising:
a plurality of extendable punches, each with an impact surface, said impact surfaces alternating between a first desired pattern comprising a plurality of piercing points and a second desired pattern comprising an essentially flat surface, the length and width of each said impact surface approximately equal to the desired length and width of said cavity;
a die body including a plurality of apertures adapted to receive each said punch;

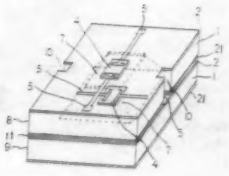


an opposing post positioned within each said aperture having an impact surface congruent with each said impact surface; and
at least one moveable forming bushing supported by at least one forming bushing actuator slideably engaged to each said opposing post.

4,928,513
SENSOR

Takashi Sugihara, Nara; Kazutaka Uda, Tenri; Hiroki Tabuchi; Yasuhiko Inami, both of Nara; Masaya Hijikigawa, Yamatokoriyama, and Shoei Kataoka, Tanashi, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jul. 28, 1987, Ser. No. 78,741
Claims priority, application Japan, Jul. 29, 1986, 61-179625; Apr. 22, 1987, 62-99323; May 21, 1987, 62-126164; May 27, 1987, 62-130607; Jun. 8, 1987, 62-143496
Int. Cl.[5] G01N *27/04*
U.S. Cl. 73—1 G **23 Claims**



1. A sensor having a pair of sensor units, one of which is a detecting sensor unit and the other of which is a reference sensor unit, wherein said detecting sensor unit comprises
a substrate with a hollow portion, a thin insulating layer with a bridge shape disposed on said substrate, a sensitive film disposed on the bridge portion of said thin insulating layer, and a pair of electrodes being in contact with said sensitive film, the sensitive film section being exposed to an atmosphere to be measured so that the electrical resistance of said sensitive film changes with a variation in the physical quantity of said atmosphere to be detected; and
said reference sensor unit comprises a substrate having a hollow portion, a thin insulating layer with a bridge shape disposed on said substrate, a sensitive film disposed on the bridge portion of said thin insulating layer, and a pair of electrodes being in contact with said sensitive film, the

sensitive film section being sealed within a shielding container so that the electrical resistance of said sensitive film is not influenced by a variation in the physical quantity of the atmosphere outside of said container, whereby the absolute physical quantity of the atmosphere to be detected is determined by the output power of said sensor based on a difference between said electrical resistance of the detecting sensor unit and said electrical resistance of the reference sensor unit.

4,928,514

CALIBRATION CONTAINER

Brook J. Beaston, Wichita, Kans., assignor to Great Plains Industries, Inc., Wichita, Kans.

Continuation-in-part of Ser. No. 96,846, Sep. 15, 1987, and a continuation of Ser. No. 170,152, Mar. 18, 1988, abandoned. This application Jul. 12, 1989, Ser. No. 379,585
Int. Cl.[5] G01F *25/00*
U.S. Cl. 73—3 **5 Claims**

1. A calibration container for measuring a precise quantity of liquid, the calibration container comprising:

an open-top vessel constructed of a polymeric material and having a generally cylindrically shaped main body portion and a substantially transparent neck portion, the neck portion being substantially smaller in diameter than the main body portion, the neck portion extending substantially vertically from the main body portion and having at least one scale support rib extending along the length thereof; and

scale means slidably supported on the neck portion of the vessel for indicating the meniscus level of a measured amount of a liquid, the scale means secured to the neck portion to establish such meniscus level, the scale means comprising a graduated indicator scale having a zero indicator pointer, the indicator slidably supported on the scale support rib and permanently attachable thereto when the zero indicator is aligned with the liquid meniscus.

5. A method of providing and calibrating a calibration container for measuring a precise quantity of a selected liquid, comprising:

forming a substantially transparent vessel having a body portion and a neck portion, the neck portion being smaller in diameter than the body portion and extending vertically therefrom, the neck portion having a pair of scale support ribs extending along the length thereof;

forming an indicator scale having a zero pointer and shaped to be slidably supported on the scale support ribs;

filling the vessel with a precise quantity of selected calibration liquid so that a meniscus level of the liquid appears within the neck portion;

moving the indicator scale along the scale support ribs to align the zero pointer with the liquid meniscus as same is viewed through the neck portion;

affixing the indicator scale to the neck portion so that the indicator scale is permanently secured at the position established by the preceding step; and

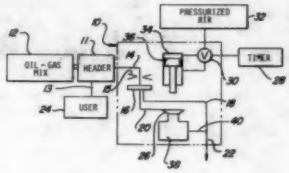
removing the calibration liquid contained therein for achieving the above steps.

4,928,515

OIL MIST SENSOR

Nils O. Rosaen, P.O. Box 242, Clarkston, Mich. 48016

Filed Nov. 30, 1988, Ser. No. 277,869
Int. Cl.[5] B01D *17/02*
U.S. Cl. 73—61 R **21 Claims**



1. A device for detecting the presence of oil in an oil-gas mixture, said device comprising:

a fluid passageway through which said mixture is directed;

means included in said fluid passageway for separating a quantity of oil from said oil-gas mixture;

means for collecting said quantity of separated oil in a reservoir for a predetermined collecting cycle;

means for sampling said reservoir at the end of said collecting cycle to detect the presence of oil;

means for indicating the presence of oil in said reservoir;

said separating means comprising means disposed in said fluid passageway for defining at least one restricted portion and a collecting plate disposed in said fluid passageway downstream from said restricted portion;

said last mentioned means comprising a cylindrical spindle disposed in said fluid passageway and having a downstream and facing said collection plate; and

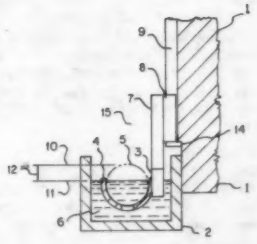
wherein said fluid passageway is formed in part by a centrally disposed portion of said spindle having a reduced diameter defining a spindle wall; and wherein said at least one restricted portion comprises at least one bore through said wall, extending from said annular chamber to said downstream end of said spindle.

4,928,516

APPARATUS FOR DETERMINING THE CENTER OF GRAVITY OF A SPHERICAL BALL

Nyle O. Movick, 4600 Macky Way, Boulder, Colo. 80303

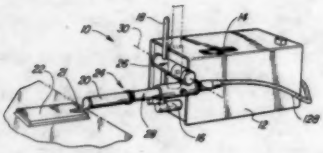
Filed Feb. 29, 1988, Ser. No. 162,075
Int. Cl.[5] G01M *1/12*
U.S. Cl. 73—65 **2 Claims**



1. Apparatus for determining the axis of at least one unbalanced spherical ball, which axis includes the ball's geometric center and the ball's center of gravity, said apparatus comprising:

a container means for holding a predetermined liquid,
at least one spherical cup for holding said spherical ball, said spherical cup fitting closely to the spherical ball yet allowing the ball to freely rotate when immersed in said predetermined liquid,
a rigid assembly, to which is affixed said at least one spherical cup,
support means to which the assembly is attached, said support means allowing the raising and lowering of said assembly and allowing the lowering and raising of said spherical ball into and out of said predetermined liquid.

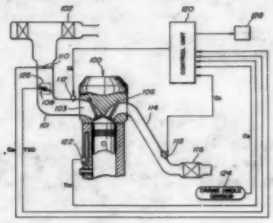
4,928,517
SURFACE MEASURING INSTRUMENT LINK ARM ASSEMBLY
Frederick L. Fitts, Ann Arbor, Mich., assignor to Precision Devices Inc., Milan, Mich.
Filed Aug. 10, 1987, Ser. No. 83,358
Int. Cl.[5] G01B *5/28*
U.S. Cl. 73—105 **5 Claims**



1. A link arm assembly for coupling a surface finish measuring unit to a surface evaluating probe comprising:
a probe mounting arm having mounting means for mounting said probe,
a pivot bearing assembly having a first portion thereof coupled to said probe mounting arm and a second portion thereof coupled to said unit wherein said first and second portions are rotatable with respect to each other such that said probe mounting arm is movable between a normal generally vertical position to an operating generally horizontal position in which said probe rests on a workpiece, and
clutching means for permitting said probe mounting arm to be freely moved from said operating to said normal position but providing damping when said probe mounting arm is moved from said normal to said operating position thereby limiting the impact forces acting on said probe when contacting said workpiece.

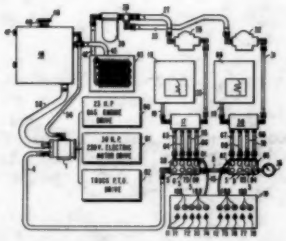
4,928,518
OXYGEN SENSOR OPERABILITY SENSING ARRANGEMENT
Hideyuki Tamura, Yokohama, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan
Filed Feb. 17, 1989, Ser. No. 311,796
Claims priority, application Japan, Feb. 25, 1988, 63-43488
Int. Cl.[5] G01M *15/00*
U.S. Cl. 73—117.3 **6 Claims**

1. A method of monitoring the operation of a oxygen sensor and diagnosing a malfunction thereof, comprising the steps of:
sensing the oxygen content of exhaust gases emitted from an internal combustion engine using an oxygen sensor, said oxygen sensor being operatively disposed in an exhaust conduit and arranged to be exposed to the exhaust gases emitted from said engine;
sensing said engine having assumed a warmed-up status;
sensing the engine load and the engine speed and determining the instant engine operational status using said engine load and engine speed after the engine has warmed-up;
determining if the instant engine operational status falls within a predetermined operational zone; and
indicating a oxygen sensor malfunction in the even that the



oxygen sensor output remains continuously below a first predetermined value and above a second predetermined value for a predetermined period of time with said engine operating in said predetermined operational zone.

4,928,519
BRAKE TESTING APPARATUS
Earl Frederick, Albuquerque, N. Mex., assignor to Vehicle Safety Controls, Inc., Columbia City, Ind.
Filed Sep. 28, 1988, Ser. No. 250,081
Int. Cl.[5] G01L *5/28*
U.S. Cl. 73—126 **35 Claims**



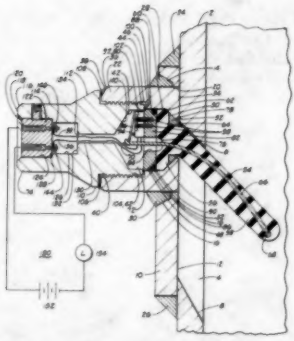
1. A braking force measuring system comprising:
a pair of spaced rollers capable of supporting a wheel with the axis of the wheel generally parallel with the axes of the rollers,
means for driving at least one of said rollers at a constant speed,
means for measuring the energy required to rotate said driven roller(s), in which said driving means comprises at least one hydraulic motor operatively associated with said measuring means; and said measuring means comprises hydraulic fluid pressure measuring means.

4,928,520
PLUG RELEASE INDICATOR
Burchus Q. Barrington, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.
Continuation of Ser. No. 318,215, Mar. 2, 1989, abandoned. This application Nov. 7, 1989, Ser. No. 433,398
Int. Cl.[5] E21B *33/00*
U.S. Cl. 73—151 **19 Claims**

1. A plug release indicator for determining when a cementing plug passes a predetermined point, said indicator comprising:
a casing having a slotted portion defined therethrough;

switch means, disposed proximate said casing, for closing an electrical circuit;

resilient probe means, extending through said slotted portion and into the interior of said casing, for contacting said cementing plug;



a wire embedded within said probe means, said wire having a lip formed on an end thereof extending from said probe, said lip actuating said switch means upon passage of said cementing plug; and

indicating means electrically connectable to said switch means, for indicating the passage of said cementing plug.

4,928,521

METHOD OF DETERMINING DRILL BIT WEAR

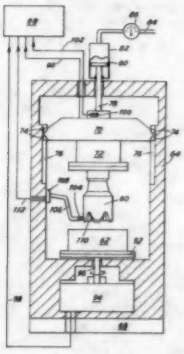
Stuart Jardine, Cambridge, England, assignor to Schlumberger Technology Corporation, Houston, Tex.

Filed Mar. 27, 1989, Ser. No. 328,655

Claims priority, application United Kingdom, Apr. 5, 1988, 8807889

Int. Cl.[5] E21B *47/00*

U.S. Cl. 73—151 **11 Claims**



1. A method of determining the state of wear of a multicone drill bit fixed at the lower end of a drill string for drilling a borehole in the earth, according to which vibrations generated by the working drill bit are detected and converted into a time oscillatory signal from which a frequency spectrum is derived, characterized by extracting the periodicity of the frequency spectrum, determining from said periodicity the rate of rotation of at least one cone and deriving the state of wear of the drill bit from said rate of cone rotation.

4,928,522

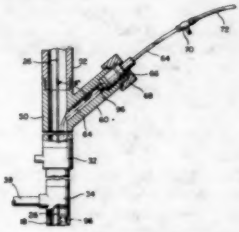
STEAM INJECTION SURVEY APPARATUS AND METHOD FOR TESTING WELLS

Gerald J. Tonnelli, Bakersfield, Calif., assignor to Production Data, Inc., Bakersfield, Calif.

Filed Feb. 10, 1989, Ser. No. 308,519

Int. Cl.[5] E21B *49/00*

U.S. Cl. 73—155 **19 Claims**



18. In combination with a tubing string for a well to which a steam line is connected above ground, a logging tool assembly having a radiation detecting device and an elongated wire line extending therefrom, a stuffing box through which the wire line extends while blocking outflow of well fluids, a lubricator pipe connected to the stuffing box and enclosing the radiation detecting device in a storage position, a tubular riser coupled to the lubricator pipe and a swab valve interconnecting the riser and the tubing string in axial alignment with each other above the steam line, means for injecting a radio-active tracer into the tubing string, including an injection port mounted on the riser having an injection axis at an acute angle to the riser and the tubing string, an injection tube through which the tracer is conducted, means mounted by the injection port for slidably guiding displacement of the injection tube along said injection axis thereof from a retracted position to an extended position below the steam line within the tubing string.

4,928,523

METHOD AND APPARATUS FOR IDENTIFYING BALLISTIC CHARACTERISTICS WITHIN A WEAPON BARREL

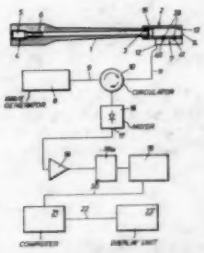
Gerhard Muhrer; Reinhard Pannold, and Reinhard Boschanig, all of Graz, Austria, assignors to AVL Gesellschaft fur Verbrennungskraftmaschinen und Messtechnik m.b.H. Prof. Dr.Dr.h.c. Hans List, Austria

Filed Mar. 3, 1989, Ser. No. 319,098

Claims priority, application Austria, Mar. 4, 1988, 575/88

Int. Cl.[5] G01L *5/14*

U.S. Cl. 73—167 **21 Claims**



1. In a method for non-destructive identification of ballistic characteristics within a barrel of a weapon, wherein an electro-

magnetic wave is introduced into the barrel of the weapon via a waveguide adaptor coupled to a muzzle of the barrel, wherein a reflected electromagnetic wave is received out from the barrel after reflection off of a projectile positioned within the barrel, and wherein changes in phase relationships between the introduced and received electromagnetic waves are employed as a measure of change of position of the projectile, the steps of:

dividing the wave to be introduced into the barrel into wave parts; and

supplying the wave parts to at least two preselected spaced apart locations on the waveguide adaptor so that wave parts propagating into the barrel in the direction of the projectile situated therein add up and wave parts propagating in the opposite direction cancel each other out.

4,928,524

METHOD AND APPARATUS FOR MEASURING FLOW RATE OF A GAS CONTAINING CONDENSABLE COMPONENTS AND MISTS

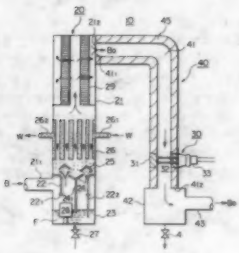
Tokio Sugi; Yasuo Mori, both of Tokyo, and Yugi Takahashi, Chigasaki, all of Japan, assignors to Tokyo Keiso Co., Ltd., Tokyo, Japan

Filed Mar. 23, 1989, Ser. No. 328,067

Claims priority, application Japan, Jul. 22, 1988, 63-181644; Aug. 2, 1988, 63-102054[U]

Int. Cl.[5] G01F *1/74*

U.S. Cl. 73—200 **9 Claims**



1. A method for measuring a flow rate of a gas in which condensable components; and mist are contained in such as a blow by gas leaking from combustion chambers of cylinders into a crank case in a reciprocating internal combustion engine comprising the steps of: principally removing said mists from said gas; principally removing said condensable components from said gas from which most of said mists have been removed in the previous step, by cooling said gas to a temperature close to atmospheric temperature; and measuring the flow rate of said gas from which substantially all of said mists and said condensable components have been removed by means of a gas flow meter.

4,928,525

SONIC TANK INVENTORY CONTROL SYSTEM AND METHOD

Gary L. Aderholt, R.R. 14, Box 132, and Michael A. Lenox, R.R. 14, Box 132-A, both of Athens, Ala. 35611

Filed Mar. 2, 1989, Ser. No. 318,223

Int. Cl.[5] G01F *23/28*

U.S. Cl. 73—290 V **29 Claims**

1. A system for measuring the level of a fluid in a tank, comprising:

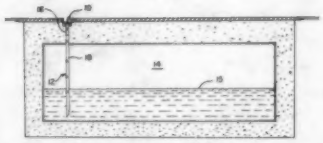
a plurality of reflectors positioned in the tank with said reflectors being a known distance from one another and a first reflector being an unknown distance from the top of the tank; and

an apparatus for producing and outputting a sonic signal and for receiving echoes from said plurality of reflectors and a surface of the fluid in the tank, said apparatus producing electrical signals representative of said received echoes, said apparatus including processor means responsive to said electrical signals for,

(i) calculating the distance between said apparatus and said first reflector,

(ii) calculating the distance between a last reflector above the fluid surface and the fluid surface, and

(iii) determining the total distance from said apparatus to the fluid surface based on the distances calculated in (i), (ii), and the distance between said first and last reflectors.



20. A method of measuring the level of a fluid in a tank having a plurality of reflectors positioned therein with the reflectors being a known distance from one another and a first reflector being an unknown distance from the top of the tank, said method comprising the steps of:

outputting a sonic signal into the tank;

producing input signals in response to echoes from the plurality of reflectors and a surface of the fluid in the tank;

(i) calculating the distance between the top of the tank and the first reflector;

(ii) calculating the distance between a last reflector above the fluid surface and the fluid surface; and

determining the total distance from the top of the tank to the fluid surface based on the distances calculated in (i), (ii), and the distance between the first and last reflectors.

4,928,526

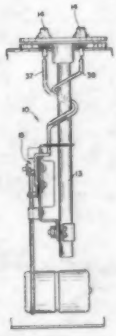
UNIVERSAL FUEL SENDER

Frank C. Weaver, Chicago, Ill., assignor to Stewart Warner Instrument Corporation, Chicago, Ill.

Filed Nov. 29, 1988, Ser. No. 277,292

Int. Cl.[5] G01F *23/36*

U.S. Cl. 73—313 **4 Claims**



1. A universal fuel sender adapted to be mounted within a fuel tank, comprising;

a top plate adapted to be fastened over an opening in the fuel tank,

a support rod having an axially uniform cross-section so that it may be manufactured in long lengths,

means for attaching said support rod to said top plate so that said support rod extends into the fuel tank,

a substantially U-shaped rheostat mounting bracket having a pair of spaced rod receiving openings therein each having a shape complementary to the rod cross-section so that the mounting bracket is adjustable to any desired position along the rod, said mounting bracket defining a pocket facing said rod,

means for adjustably clamping the bracket to the rod,

a rheostat comprising a pivotally moveable wiper arm and a generally arcuate thick film resistor applied to a substrate, said wiper arm and said substrate being mounted on the mounting bracket within said pocket, and

a float arm assembly means for driving said rheostat including at least a float arm wire and a float, said float arm wire being connected to said wiper arm and pivotally mounted to said mounting bracket so as to be pivotable in a plane parallel to said substrate concentrically with said thick film resistor, said float being arranged on a distal end of said float arm wire so that movement of said float causes the float arm wire to pivot and drive the wiper arm of said rheostat.

4,928,527

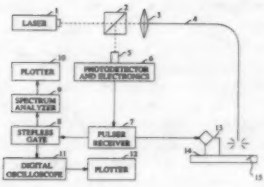
METHOD AND DEVICE FOR NONDESTRUCTIVE EVALUATION

Christian P. Burger, College Station, Tex.; Thomas D. Dudderar, Chatham, N.J.; John A. Gilbert; Bruce R. Peters, both of Huntsville, Ala., and James A. Smith, Idaho Falls, Id., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Apr. 29, 1988, Ser. No. 187,805

Int. Cl.[5] G01N *29/00*

U.S. Cl. 73—657 **16 Claims**



1. In the manufacture or maintenance of an article, a method for examining at least a portion of a surface of said article with respect to inhomogeneity of a surface property, said method comprising (i) providing energy to said surface, and (ii) sensing a surface wave at least at a point of said portion,

characterized in that sensing of said surface wave comprises fiber-optical interferometry between first and second optical signals here designated as reference and object signals,

said reference and object signals being derived from an optical signal here designated as laser signal and having been transmitted by an optical fiber,

said first optical signal being derived from said laser signal by internal reflection of a first portion of the power of said laser signal at the end of said optical fiber, and

said second optical signal being derived from said laser signal by emission of a second portion of the power of said laser signal from the end of said fiber, followed by reflection from said surface at said point.

4,928,528

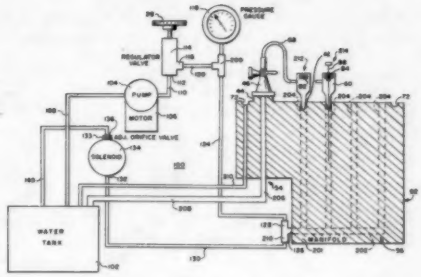
ARTERIAL/VENOUS SIMULATOR

Jose A. Marques, Miami, Fla., assignor to Cordis Corporation, Miami, Fla.

Filed Jul. 25, 1988, Ser. No. 223,868

Int. Cl.[5] G01M *3/28*

U.S. Cl. 73—40 **18 Claims**



1. A testing device for testing the sealing strength of a seal in a catheter sheath introducer comprising:

means for receiving the introducer;

means for supplying pulsating liquid to the inside of the introducer; and

means for controlling the upper and lower pressures of the fluid supplied to the introducer while observing the sealing strength of the seal, with or without an elongate, rod-like member received therein.

4,928,529

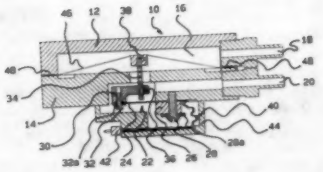
FORCE MULTIPLYING MEMBRANE INSTRUMENT

Robert O. Brandt, Jr., 5404 Pond Dr., Wilmington, N.C. 28403

Continuation-in-part of Ser. No. 128,777, Dec. 4, 1987, abandoned. This application Nov. 3, 1988, Ser. No. 266,822

Int. Cl.[5] G01L *7/08, 9/04*

U.S. Cl. 73—726 **16 Claims**



1. A force multiplying membrane instrument comprising:

a housing structure having an open internal chamber;

a substantially constant area membrane spanning the open chamber and secured about its perimeter by the housing structure such that it includes concave and convex opposite sides as disposed in the open chamber;

a force sensor disposed on the concave side of the membrane, said force sensor comprising a beam secured about one end to the housing and extending in cantilever fashion therefrom;

means interposed between the force sensor and the membrane for transferring a force applied to the membrane to the force sensor comprising a bracket secured to the end of the beam opposite the end attached to the housing, a rod secured to the bracket and extending upwardly therefrom and an engager attached to the rod for engaging and supporting the membrane about a central portion thereof; and wherein the convex side of the membrane forms an input side for receiving an input force that is effectively multi-

plied by the membrane due to its convex orientation and its physical characteristics, and wherein the multiplied force generated by the membrane is transferred to the force sensor that produces an output which represents the input force as multiplied by the membrane.

4,928,530

PRESSURE TRANSDUCER

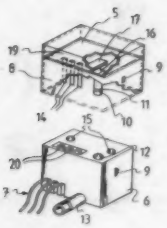
Ari Lehto, Helsinki, Finland, and Frank Chen, Broom Manor, United Kingdom, assignors to Vaisala Oy, Helsinki, Finland

Filed Dec. 6, 1988, Ser. No. 280,362

Claims priority, application Finland, Dec. 7, 1987, 875387

Int. Cl.[5] G01L 9/00

U.S. Cl. 73—756 **6 Claims**



1. A pressure transducer comprising:

(a) a box-like socket having

an upper side,

an external pressure connection,

first internal pressure connection means at the upper side and being connected to the external pressure connection,

external electrical conductors, and

first internal electrical connection means at the side and being connected to the conductors; and

(b) a plug-in unit having

a box-like splash-water protection sheath open at one side thereof, said sheath having internal dimensions at least approximately corresponding to external dimensions of the box-like socket,

an electronic circuitry port provided inside the sheath,

second internal pressure connection means, and

second internal electrical connection means,

the sheath of the plug-in unit being placed over the box-like socket to encase the socket from above and from the sides thereof, the second internal pressure connection means being received in the first internal pressure connection means and the second electrical connection means being received in the first electrical connection means when the sheath is over the plug-in unit.

4,928,531

FASTENING DEVICE FOR THE ATTACHING OF AN ELECTRIC TRANSMITTER

Klaus Schult, Frankfurt am Main; Horst Kister, Wehrheim, Fed. Rep. of Germany, and Michael Quenzer, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to VDO Adolf Schindling AG, Frankfurt am Main, Fed. Rep. of Germany

Filed Apr. 11, 1988, Ser. No. 179,720

Claims priority, application Fed. Rep. of Germany, Apr. 11, 1987, 3712424

Int. Cl.[5] G01L 1/00

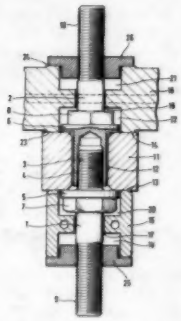
U.S. Cl. 73—855 **8 Claims**

1. In a fastening device for the attaching of an electrical shear-stress transmitter to a supporting structural part of an aircraft landing gear; and wherein

the structural part has two extensions spaced apart from each other, each extension having a hole passing through it, said transmitter having an atiachment end with a hole therein, there being plural threaded bolts with at least one nut engageable with each bolt, each of said extensions being bolted to at least one attachment end of the transmitter by a threaded bolt which extends through the extension into the attachment end, and at least one nut for engagement with a threaded bolt, the attachment end lying against one side of the extension; the improvement wherein

two of said transmitter are attached on opposite sides of each said extension, said device having plural bolt assemblies each of which incorporates the threaded structure of at least one of said bolts and one of said nuts; and wherein

each said bolt assembly comprises a first collar means and a second collar means for engagement with opposite sides of one of said extensions, each said bolt assembly including bolt means passing through a hole of said one extension for



urging said first and said second collar means against opposite sides of said one extension for securing thereto said bolt means, said bolt means extending outwardly of each said collar means for receipt of attachment ends of said two transmitters on opposed termini of said bolt means; and wherein

said bolt means is bolted to each said collar means, each said collar means being of widened diameter on both sides of a shank of the bolt means;

each of the attachment ends has a recess large enough to envelope a collar means to permit resting on an extension, without resting on the collar means; and

the bolt means has on each terminus a threaded section for engagement with at least one nut which is screwed on each threaded section, each nut pressing one of the two attachment ends against an extension.

4,928,532

HYDROSTATIC SELF-ALIGNING AXIAL/TORSIONAL MECHANISM

Daniel G. O'Connor, and Howard L. Gerth, both of Knoxville, Tenn., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed May 23, 1989, Ser. No. 355,585

Int. Cl.[5] G01N 3/02

U.S. Cl. 73—856 **2 Claims**

1. A self-aligning loading mechanism for applying a controlled axial and/or torsional load to a test specimen comprising:

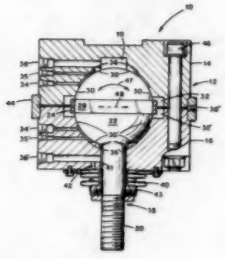
(a) a split support housing having a distal half and a proximal half defining a spherical cavity; said proximal half, having an opening from said spherical cavity;

(b) annular recesses equally spaced within said support housing about said spherical cavity;

(c) an essentially frictionless ball stud, the ball portion of said

ball stud being a spherical bearing, and having a flat surface about the equator of said ball portion of said ball stud.

(d) a flexure ring having a thickened portion, rigidly affixed to said flat portion about the equator of said ball portion of said ball stud;



(e) a means for supplying pressurized oil to each of said annular recesses at the same oil pressure;

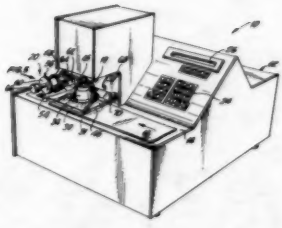
(f) a stud portion of said ball stud extending through said opening in said proximal half support housing; and said stud portion of said ball stud being adapted to attach a load or gripping means.

4,928,533

BURST TESTING APPARATUS

Walter F. Bachelder, Saloga; John L. Sullivan, Kings Park; Peter J. Fiore, Mt. Sinai, and Godfrey L. Hansen, Amityville, all of N.Y., assignors to Testing Machines Inc., Amityville, N.Y.

Filed Jun. 30, 1989, Ser. No. 374,480
Int. Cl.[5] G01N *3/00*
U.S. Cl. 73—838 **11 Claims**



1. A burst testing apparatus for testing the burst strength of sheet material, said apparatus comprising:

testing means for testing the burst strength of a sheet of material at a plurality of spaced apart locations thereon;

feed means for automatically advancing the sheet material a preselected distance intermediate successive tests by the testing means;

override means for rendering the feed means inoperative and enabling manual feeding of the sheet material into the burst testing apparatus; and

sheet sensing means for sensing the presence of the sheet material in the burst testing apparatus and for generating a signal to initiate the testing after activation of the override means and after manual feeding of the sheet material.

9. A burst testing apparatus for testing the burst strength of sheet material, said apparatus comprising:

a generally horizontal support surface for supporting a sheet of material to be tested;

testing means for testing the burst strength of the sheet of material on the support surface;

a generally cylindrical rotatable drive roller disposed gravitationally below the sheet of material on the support surface and in frictional engagement with the sheet of material;

motor means for selectively rotatably driving the drive roller;

control means operatively connected to the motor means for alternately enabling automatic or semiautomatic operation of the testing apparatus such that during automatic operation of the testing apparatus the control means enables operation of the motor means after a test by the testing means for rotatably driving the drive roller and such that during semiautomatic operation of the testing apparatus the control means prevents the motor means from rotatably driving the drive roller; and

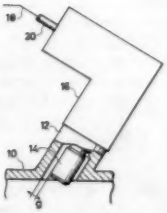
a weighted follower roller rotatably mounted along an axis disposed gravitationally above the drive roller, said weighted follower roller comprising a double hinge for enabling said weighted follower roller to translate in an alignment generally parallel to the drive roller in response to different thicknesses of the sheet material passing therebetween and being rotatable away from the drive roller to enable semiautomatic operation of the testing apparatus.

4,928,534

SOCKET STRUCTURE FOR MOUNTING ULTRASONIC GAS FLOW MEASURING DEVICE WITH RESPECT TO GAS FLOW PIPE

Kouji Ichino, Tokyo, Japan, assignor to Kaijo Denki Co. Ltd., Japan

Continuation of Ser. No. 687, Jul. 10, 1986, Pat. No. 4,823,612.
This application Jan. 12, 1989, Ser. No. 295,990
Int. Cl.[5] G01F *1/66*
U.S. Cl. 73—861.18 **1 Claim**



1. A socket structure for mounting an ultrasonic gas flow measuring device with respect to a gas flow pipe, comprising:

a pair of sockets provided at said pipe to respectively receive therein ultrasonic transmit-receive elements of said ultrasonic gas flow measuring device therein with a suitable gap being defined therebetween and communicated to said pipe, said sockets being arranged in a manner to be spaced from each other at an angle of 180 degrees in the circumferential direction of said pipe and oblique with respect to an axis of said pipe;

a moisture collection preventing means provided at each of said sockets for preventing moisture contained in said gas from being condensed and collected between each of said sockets and said ultrasonic transmit-receive element received therein to a degree sufficient enough to form a bridge therebetween, said moisture collection preventing means comprising

a gap defined between said socket and said ultrasonic transmit-receive element received in said socket, said gap having a dimension of about 5 mm or more, which is sufficient to prevent condensed moisture from being collected

therein to form a bridge between said socket and said ultransonic transmit-receive element.

4,928,535

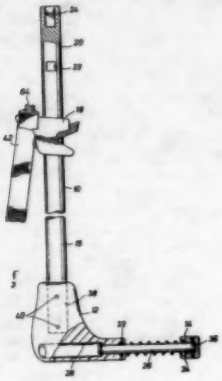
METHODS AND APPARATUS FOR MEASURING SKI BOOT BINDING TORQUE

John S. Perryman, Kinnelon, N.J., assignor to Oshman's Sporting Goods, Inc., Houston, Tex.

Continuation-in-part of Ser. No. 255,125, Oct. 7, 1988, abandoned. This application Feb. 21, 1989, Ser. No. 317,091

Int. Cl.[5] G01L *5/03*

U.S. Cl. 73—862.02 **16 Claims**



1. A device for testing the release torque of a ski binding holding a boot, the device comprising:

a foot,

a toe movably connected to the foot for accommodating ski boots of different size,

a leg secured to and extending upwardly from the foot,

a clamp disposed about the leg and movable therealong for tightly securing a strap around a ski boot in which the foot is positioned to stabilize the leg in the ski boot, and

means in the leg for receiving and bolding a torque measuring apparatus.

4,928,536

FLUID SAMPLE APPARATUS FEATURING INTEGRAL CONSTRUCTION WITH A MOTOR DRIVEN SAMPLING SYSTEM

Brian H. Welker, Sugarland, Tex., assignor to Welker Engineering Company, Sugar Land, Tex.

Filed Oct. 10, 1989, Ser. No. 418,522

Int. Cl.[5] G01N *1/14*

U.S. Cl. 73—863.83 **13 Claims**

1. An assembly for obtaining a fluid sample from a pressurized pipeline comprising:

(a) an elongate body having

(i) a first end formed to connect to a pipeline to position a pressurized fluid inlet in the pipeline to receive pressurized fluid;

(ii) a central body portion connected to said first end; and

(iii) a second end deployed from said first end;

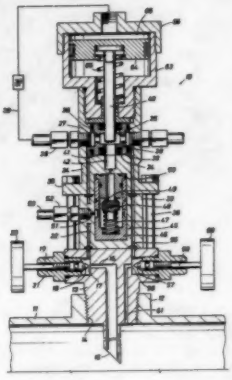
(b) a fluid flow line connected from said fluid inlet to deliver a flow of fluid;

(c) fluid sampling means connected to said fluid flow line to deliver fluid thereto in a volume in excess of said sample;

(d) said sampling means periodically removing fluid from said fluid flow line;

(e) outlet means connected to said sampling means for delivery of a fluid sample without regard to the pressure in the pipeline;

(f) check valve means cooperative with said outlet means to enable fluid to flow through said outlet means to overcome back pressure encountered by fluid flow;



(g) rigid chamber connecting means connecting said sample means and check valve means; and

(h) motor means in said body for operating said sampling means to direct fluid through said outlet means.

4,928,537

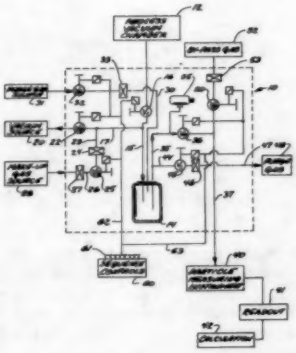
SYSTEM FOR AIRBORNE PARTICLE MEASUREMENT IN A VACUUM

Benjamin Y. H. Liu, North Oaks, Minn., and Wladyslaw W. Szymanski, Vienna, Australia, assignors to Regents of the University of Minnesota, Minneapolis, Minn.

Filed Dec. 6, 1988, Ser. No. 280,483

Int. Cl.[5] G01N *15/10, 1/24;* **G06M** *11/00*

U.S. Cl. 73—863.86 **11 Claims**



1. A particle measuring apparatus for sampling a gas in a first chamber having a vacuum level comprising:

a sample vacuum chamber that is maintained at a vacuum lower than that of the vacuum in the first chamber;

first valve means for controlling gas flow from the first chamber into the sample vacuum chamber when the first valve means is open;

second valve means for providing gas into the sample vacuum chamber subsequent to closing of the first valve

means, and operable to provide as gas flow through the sample vacuum chamber; and

particle measuring means connected to the sample vacuum chamber and controlled to receive gas from the sample vacuum chamber when the flow through the second valve means is occurring, whereby the gas in the sample vacuum chamber is purged through the sample vacuum chamber and into the particle measuring means.

4,928,538

MONITORING TENSION IN AN ELONGATE FLEXIBLE MEMBER

James S. Burdess, 12 Earnshaw Way, Whitley Bay; John N. Fawcett, 5 Kingsland, Jesmond, Newcastle upon Tyne, and James R. Hewit, Loughborough, all of United Kingdom, assignors to James Stonehouse Burdess, Whitley Bay and John Neville Fawcett, New Castle Upon Tyne, both of, United Kingdom

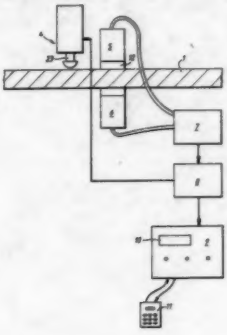
PCT No. PCT/GB87/00171, § 371 Date Oct. 11, 1988, § 102(e) Date Oct. 11, 1988, PCT Pub. No. WO87/05699, PCT Pub. Date Sep. 24, 1987

PCT Filed Mar. 12, 1987, Ser. No. 250,619

Claims priority, application United Kingdom, Mar. 12, 1986, 8606074

Int. Cl.[5] **G01L** *5/04, 1/10*

U.S. Cl. 73—862.41 **15 Claims**



1. A method of monitoring the tension in an elongate flexible member, the method including the steps of causing at least a portion of the flexible member to vibrate at a natural frequency and detecting the frequency of the resulting vibrations with a pair of transducers arranged on opposite sides of the flexible member and subtracting one transducer output signal from the other transducer output signal to provide an enhanced flexible member vibration signal and to reduce extraneous noise signals.

4,928,539

DEVICE FOR AUTOMATICALLY TAKING LIQUID FROM A BOTTLE

Henri Champseix, Montesson, and Serge Champseix, Les Mureaux, both of France, assignors to A.B.X., Hauts-de-Seine, France

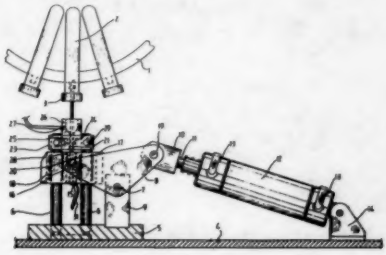
Filed Oct. 5, 1987, Ser. No. 104,101

Claims priority, application France, Oct. 6, 1986, 86 13875

Int. Cl.[5] **G01N** *35/00, 1/10, 35/06*

U.S. Cl. 73—864.24 **16 Claims**

1. In a device for automatically taking liquid from a bottle presented upside down opposite a sample taking needle intended to pierce the stopper of the bottle and penetrate into the liquid, including a mobile support for storing a plurality of bottles and moving a bottle into a preselected position with respect to a stopper piercing assembly, said assembly including a mobile block serving as a support for the sample taking needle and being movable under the action of an actuating cylinder, with the sample taking needle being essentially centered on the mobile block, and a rinsing receptacle which is fixedly mounted and through which the needle passes, wherein said mobile block slides on two fixed vertical guide columns



between which the actuating cylinder is operatively connected to the mobile block essentially at the middle of the block, and between which the sample taking needle moves vertically by transmission of the action of the actuating cylinder by transmission of a horizontal movement produced therewith, and wherein a fixed spacer is mounted on the two columns at their upper ends and serves as a support for the rinsing receptacle.

4,928,540

METHOD OF DISPENSING COAGULATIVE TEST LIQUID

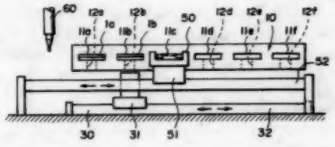
Keishiro Kido, and Sigeru Tezuka, both of Saitama, Japan, assignors to Fuji Photo Film, Co., Ltd., Kanagawa, Japan

Filed Jan. 18, 1989, Ser. No. 299,272

Claims priority, application Japan, Jan. 18, 1988, 63-7858

Int. Cl.[5] **B01L** *3/02*

U.S. Cl. 73—864.11 **5 Claims**



1. A process of repeatedly supplying a predetermined amount of a coagulative test liquid onto a chemical assay slide for incubation of the test liquid, said process comprising the steps of;

filling a nozzle of a dispenser with said test liquid,

drawing said test liquid back into said dispenser such that a lower surface of said test liquid is retracted from a lower tip end of said nozzle by a distance which is not smaller than an inner diameter of said nozzle,

holding said test liquid for a period of time of 3 minutes or more retracted from the lower tip end of the nozzle by said distance to prevent coagulation of said test liquid, and then

discharging a predetermined amount of said test liquid.

4,928,541
GROUNDWATER SAMPLING APPARATUS

Donald A. Toon, Burlington, and Douglas J. Belshaw, Georgetown, both of Canada, assignors to Solinst Canada Limited, Ontario, Canada

Filed Feb. 2, 1989, Ser. No. 305,447
Claims priority, application United Kingdom, Feb. 5, 1988, 8802700
Int. Cl.[5] G01N *1/12*
U.S. Cl. 73—864.63 **8 Claims**

1. Apparatus for collecting a sample of fluid, and for containing the collected sample, wherein:

the apparatus includes a chamber, and the chamber is defined by a fixed wall and a movable wall, and the chamber is of variable volume in that the movable wall is movable with respect to the fixed wall;

the apparatus includes first and second one-way check-valves, each check-valve being arranged so as to permit fluid to flow through itself in one direction only;

one of the check valves is located in the fixed wall, and the other of the check valves is located in the movable wall;

the first check valve is so arranged as to permit fluid to flow into the chamber only;

the second check valve is so arranged as to permit fluid to flow out of the chamber only;

the apparatus includes a supply line, which is in fluid-flow communication with the chamber via the second check valve;

the arrangement of the apparatus is such that, when the pressure in the chamber exceeds the pressure in the supply line, the second check valve is open, and fluid can flow from the chamber into the supply line;

and the arrangement of the apparatus is such that, when the pressure in the supply line exceeds the pressure in the chamber, the second check valve is closed, and excess of pressure in the supply line acts upon the movable wall in the direction to reduce the volume of the chamber.

4,928,542
CONTINUOUSLY VARIABLE TRACTION ROLLER TRANSMISSION

Masaki Nakano, Kawasaki, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Feb. 22, 1989, Ser. No. 313,418
Claims priority, application Japan, Feb. 23, 1988, 63-39813
Int. Cl.[5] F16H *15/38*
U.S. Cl. 74—200 **11 Claims**

1. A continuously variable traction roller transmission of a double cavity type, comprising:

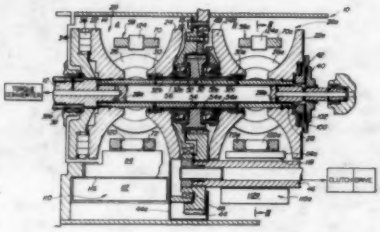
a casing;

a partition wall installed in said casing to define front and rear cavities in the same;

a first shaft extending through said front and rear cavities;

first and second motion transmitting traction mechanisms respectively installed in said front and rear cavities, each mechanism being disposed about said first shaft and operatively connected to the same;

first and second control valve body structures respectively installed in said front and rear cavities, each structure



producing a hydraulic pressure for controlling the corresponding motion transmitting traction mechanism;

a second shaft extending through only said rear cavity; and

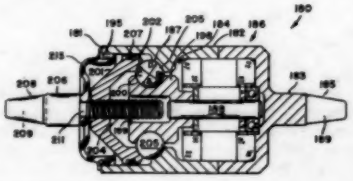
means for operatively connecting said second shaft to both of said first and second motion transmitting traction mechanisms,

wherein said second control valve body structure has a passage through which said second shaft is passed.

4,928,543
ELECTRICALLY OPERATED DRUM BRAKE

Donald D. Johannesen, South Bend, Ind., and Alistair G. Taig, Edwardsburg, Mich., assignors to Allied-Signal Inc., Morristown, N.J.

Division of Ser. No. 183,128, Apr. 19, 1988, Pat. No. 4,850,459.
This application May 4, 1989, Ser. No. 347,134
Int. Cl.[5] F16H *13/04, 13/08*
U.S. Cl. 475—196 **17 Claims**

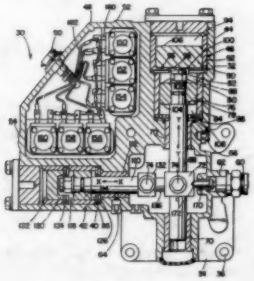


1. A traction roller drive that may be operated by motor means, comprising a housing for said roller drive, the motor means connected with a bearing drive member, the bearing drive member engaging rotatably bearing means, the bearing means in bearing engagement with a portion at said housing and a rotatable bearing member, the rotatable bearing member engaging output means and including about a periphery thereof a flexible bearing member which engages an interior surface of said housing, a first end of the housing being disposed oppositely from said output means, actuation of said motor means effecting operation of said output means so that the bearing means absorbs loading exerted upon the output means, and the bearing drive member including a curved track receiving the bearing means, a contact distance extending between said curved track and said portion which comprises a curved surface being different from a contact distance extending between said curved track and said rotatable bearing member so that rotation of said bearing means causes rotation of said rotatable bearing member.

4,928,544
DUAL PRESSURE PRESSURIZED FLUID ACTUATED SHIFTING MECHANISM

Ronald K. Markyvech, Allen Park, and Thomas A. Genise, Dearborn, both of Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed Jun. 19, 1989, Ser. No. 368,010
Int. Cl.[5] F16H *5/06*
U.S. Cl. 74—335 **14 Claims**



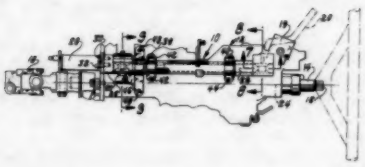
1. A control system for controlling pressurized fluid operated shift actuators (30) for mechanical transmissions, said actuators including a first (88) and a second (86) pressurizable chamber, pressurization of said first chamber effective to urge said actuator into a first position for causing engagement of a selected ratio of said transmission and pressurization of said second chamber effective to urge said actuator into a second position for causing disengagement of said selected ratio, and shift control means for selectively pressurizing and venting selected ones of said first and second chambers by selectively connecting same to a controlled source (236) of pressurized fluid and to an exhaust (54), said system characterized by:

means (220) for causing said controlled source to be pressurized to a selected one of a first pressure level or a second relatively lesser pressure level.

4,928,545
STEERING COLUMN MOUNTED TRANSMISSION GEAR SHIFT MECHANISM

John C. Singer, III, Plymouth Township, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Mar. 16, 1989, Ser. No. 324,127
Int. Cl.[5] G05G *9/16*
U.S. Cl. 74—473 SW **13 Claims**



1. A gear shift mechanism for selecting operating ranges of an automatic transmission comprising:

a shift lever movable among multiple positions corresponding to operating ranges of the transmission, the positions being mutually spaced angularly and axially;

a selector lever spaced axially from the shift lever;

means in continual contact with the selector lever and shift lever for transmitting movement of the shift lever to the selector lever;

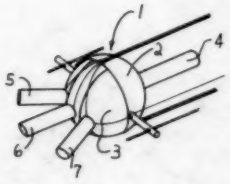
a selector position insert located adjacent the selector lever, defining spaced detent surfaces corresponding to positions among which the shift lever moves; and

spring means for biasing the selector lever toward contact with said detent surfaces.

4,928,546
ROBOTIC DEVICES

David A. Walters, P.O. Box 26776, Kansas City, Mo. 64196

Filed Aug. 17, 1988, Ser. No. 233,333
Int. Cl.[5] A61F *2/58;* **B25J** *17/02*
U.S. Cl. 74—479 **1 Claim**



1. An artificial wrist apparatus comprising a ball divided into n segments along n-1 parallel planes intersecting said ball, n first rods, each of said n first rods attached to each of said n segments, a half-sherical hollow lubricated socket into which said ball fits, a second rod attached to the back outer side of said socket, a lubricated cylindrical third rod attached at the circular center of the first of said n segments, a cylindrical hole through the center of each of said next n segments except the said nth segment, said nth segment with a cylindrical hole into but not through, said holes allowing said cylindrical third rod attached to said 1st segment to pass throught said $n-2$ segments and into said nth segment, four equally spaced guides attached equally spaced around the edge of said socket, allowing $2n+2$ tendons or cables to pass through said four guides and be free to slide and be held in position by said four guides, two fourth rods attached at opposite sides of said socket, said fourth rods attached over the locations of two of said four guides attached to said socket, said two fourth rods holding additional guides for additional tendons other than the said $2n+2$ tendons and said four guides, one of said $2n+2$ tendons connecting to the said $n=1$ first rod attached to the said $n=1$ segment and one of said $2n+2$ tendons being connected to the said $n=nth$ first rod attached to the said $n=nth$ segment, arranged so that said two tendons of the said $2n+2$ tendons pull said ball back and forth in said socket when said two tendons are alternatly pulled, and two said $2n+2$ tendons being connected to each of said first n rods connected to n segments, one of said $2n+2$ tendons connected to the bottom of said first n rods and one of said $2n+2$ tendons connected to the top of said n first rods, arranged so that when the said tendons are pulled, the said segment to which each said tendon is attached moves either upward or downward.

4,928,547
CRANK DEVICE

Johannes N. Huyer, Velserbroek, Netherlands, assignor to Vermeulen-Hollandia Octrooien II B.V., Netherlands

Filed Oct. 17, 1988, Ser. No. 258,390
Claims priority, application Netherlands, Oct. 19, 1987, 8702494
Int. Cl.[5] G05G *1/00*
U.S. Cl. 74—545 **20 Claims**

1. Crank device for driving a movable member of a vehicle, such as a panel of an open roof construction, comprising:

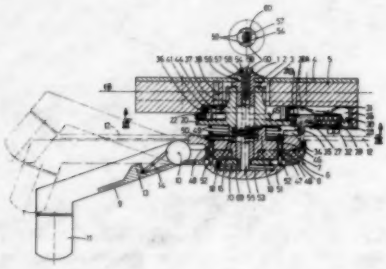
a stationary part;

a drive pinion operatively connected to the movable member and rotatably supported by the stationary part;

a crank arm connected to the drive pinion during a driving operation wherein rotation of the crank rotates the pinion;

stop means rotating with the drive pinion in a known relationship, the stop means comprising two co-operating rotatable elements, comprising a stop element directly connected to the drive pinion and including a stop member, and a retaining element rotatably driven by rotation of the pinion and provided with a releasing member;

a locking member engageable with the stop member of the stop element in a predetermined position of the movable member in order to lock the movable member in the predetermined position;



means for releasing the locking member from the stop member; and

a drive transmission between the retaining element and the drive pinion having a different transmission ratio of rotation relative to rotation of the drive pinion from the stop element, chosen such that the releasing member on the retaining element permits engagement between the locking member and the stop member only in a mutual aligned rotational position of both elements corresponding to the predetermined position of the movable member.

4,928,548

ARRANGEMENT FOR CONTINUOUSLY COMPENSATING FOR UNBALANCE ON A ROTARY MEMBER

Eugen Lulay, Bensheim, Fed. Rep. of Germany, assignor to Hofmann Werkstatt-Technik GmbH, Pfungstadt, Fed. Rep. of Germany

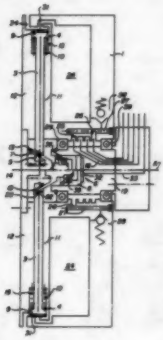
Filed Oct. 27, 1989, Ser. No. 427,486

Claims priority, application Fed. Rep. of Germany, Nov. 3, 1988, 3837373

Int. Cl.[5] F16F *15/22*

U.S. Cl. 74—573 F **28 Claims**

1. An arrangement for continuously compensating for unbalance of a rotary member, comprising: an annular container adapted to be secured to the rotary member in coaxial relationship therewith and subdivided in its circumferential direction into a plurality of balancing chambers at different angular positions; means for introducing a compensating medium which is capable of flow into the balancing chambers for an unbalance compensating operation; chamber emptying valves operatively associated with respective ones of the balancing chambers and arranged outside the axis of rotation of the arrangement, the chamber emptying valves being closed in normal operation of the arrangement; and an actuating means for opening the chamber emptying valves when the balancing chambers are filled with compensating medium, for emptying of the associated balancing chambers, the actuating means comprising an actuating piston which is arranged coaxially with respect to the annular container and which is axially displaceable relative thereto, a drive means which is controlled from the exterior of the arrangement for displacing the actuating piston, and valve displacement elements which extend radially from the actuating piston and are displaceable radially



by the actuating piston upon said axial displacement thereof, for actuating the chamber emptying valves.

4,928,549

PEDAL FOR A BICYCLE

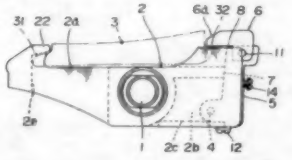
Masashi Nagano, Izumi, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan

Filed Sep. 7, 1988, Ser. No. 241,356

Claims priority, application Japan, Sep. 10, 1987, 62-227703; Aug. 30, 1988, 63-217263

Int. Cl.[5] G05G *1/14*

U.S. Cl. 74—594.6 **7 Claims**



1. A pedal for a bicycle for use together with a shoe plate fixed to the sole of a shoe of a cyclist and provided at its front and rear portions with engaging portions respectively, said pedal comprising:

a pedal shaft;

a pedal body rotatably supported to said pedal shaft, said pedal body comprising a fixing pawl disposed at a front portion thereof, said fixing pawl comprising means for retaining said front engaging portion of said shoe plate and a swinging member disposed at a rear portion thereof, said swinging member being swingable at an upper portion thereof in a direction of moving toward or away from said pedal body, a movable pawl being provided at said upper portion of said swinging member, said movable pawl having a fore end which projects toward said pedal body, said fore end of said movable pawl comprising means for retaining said rear engaging portion of said shoe plate, said movable pawl being pivoted to said upper portion of said swinging member to enable said fore end thereof to move toward or away from said pedal body, said pedal body further comprising impeding means for impeding said shoe plate from rearward movement with respect to said pedal body;

a stopper means for regulating respective swinging motions of said swinging member and said movable pawl in said direction of moving toward said pedal body; and

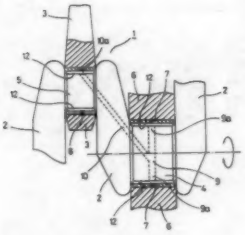
a biasing means for biasing said swinging member and said movable pawl in said direction of moving toward said pedal body.

4,928,550

SLIDING BEARING AND CRANKSHAFT USED FOR CRANKSHAFT-CONNECTING ROD ASSEMBLY

Takeshi Sakai, and Tsuneo Ito, both of Chiba, Japan, assignors to NDC Company, Ltd., Chiba, Japan

Filed Oct. 7, 1988, Ser. No. 254,638
Int. Cl.[5] F16C *3/04*
U.S. Cl. 74—595 **4 Claims**



1. A sliding bearing for a crankshaft-connecting rod assembly (1), said assembly including at least one crank portion (2) having a main journal section (4) provided at one end thereof and a connecting rod journal section (5) provided on an opposite end of said crank portion, said main journal section and said connecting rod journal section each having a lubricant port opening at the surface for supplying lubricant thereto, said sliding bearing being provided to rotatably support one of said main journal section and said connecting rod journal section, said sliding bearing comprising:

(a) a pair of split bearing halves having opposite ends which are thinner in radial thickness than a remainder of each bearing half to thereby form a predetermined clearance (12) between said sliding bearing and one of said main journal section and said connecting rod journal section;

(b) a shallow recess (11) formed in an inner bearing surface of each split bearing half and axially aligned in a position opposed to said lubricant port, said recess extending in a circumferential direction of said inner bearing surface.

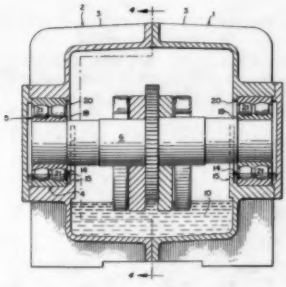
4,928,551

VIBRATING MECHANISM

James D. Connelly, and Darrel Huff, both of Princeton, W. Va., assignors to Conn-Weld Industries, Inc., Princeton, W. Va.

Filed Mar. 23, 1988, Ser. No. 172,252
Int. Cl.[5] F16C *33/66*
U.S. Cl. 74—606 R **6 Claims**

1. Vibrating mechanism comprising a housing, cylindrical sockets in opposite sides of said housing, bearings seated in said sockets, a shaft journaled in a pair of bearings in opposite sides of said housing, a sump in said housing between said sides and containing a pool of oil, counterweight means mounted on said shaft between said pair of bearings and projecting on rotation into said pool, and an individual reservoir in said housing for each socket, each reservoir being outwardly closed and inwardly open for receiving oil splashed thereto from said pool by said counterweight means and of a capacity to maintain said



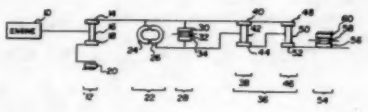
oil at a level sufficient to continuously lubricate a bearing in said socket.

4,928,552

METHOD AND APPARATUS FOR POWER TRANSMISSION FROM AN ENGINE

Darcy Gabriele, 1890 Fifth Avenue, Prince George, British Columbia, Canada (V2M 1J5)

Division of Ser. No. 846,369, Mar. 31, 1986, Pat. No. 4,825,721, which is a continuation-in-part of Ser. No. 361,359, Mar. 24, 1982, Pat. No. 4,579,019, which is a continuation-in-part of Ser. No. 137,428, Apr. 4, 1980, abandoned. This application Jan. 23, 1989, Ser. No. 300,338
Claims priority, application Canada, Mar. 27, 1981, 374035
The portion of the term of this patent subsequent to Apr. 1, 2003, has been disclaimed.
Int. Cl.[5] F16H *37/06*
U.S. Cl. 475—5 **12 Claims**



1. An apparatus for transmitting power comprising:

a first prime mover;

a second prime mover;

means for controlling the respective speeds of the first and second primer movers such that the speed of at least one of the first and second prime movers can be varied without affecting the speed of the other;

a first planetary gear assembly having a primary driving member, a second driving member and a driven follower member;

a second planetary gear assembly having a primary driving member, a secondary driving member and a driven follower member;

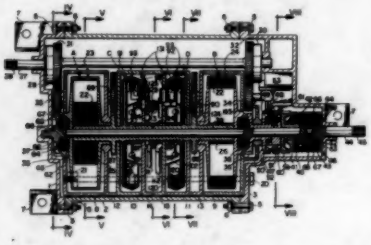
the first and second planetary gear assemblies each having a ring gear, a sun gear and a planetary carrier cage corresponding to one of the primary driving member, secondary driving member and driven follower member;

the primary driving member of the first gear assembly being coupled to the first prime mover, the secondary driving members of both gear assemblies being coupled to the second prime mover, the driven follower member of the first gear assembly being coupled to the primary driving member of the second gear assembly; and

an output shaft coupled to the driven follower member of the second gear assembly for driving a load, the output

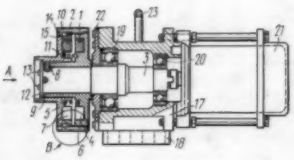
shaft serving to drive the load under most operating conditions.

4,928,553
VARIABLE-INERTIA FLYWHEELS AND TRANSMISSION
John T. Wagner, 510 Wilde Ave., Drexel Hill, Pa. 19026
Filed Apr. 30, 1986, Ser. No. 857,839
Int. Cl.[5] F16H *37/06*
U.S. Cl. 475—268 **21 Claims**



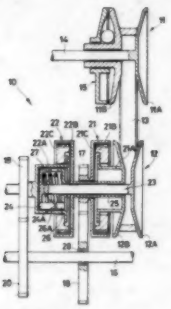
1. An energy storage apparatus comprising:
a pair of variable inertia flywheels;
an output shaft;
means for coupling the output shaft with either of said variable inertia flywheels; and
control means for simultaneously increasing the moment of inertia of one of the pair of variable inertia flywheels while reducing the moment of inertia of the remaining one of the pair of variable inertia flywheels.

4,928,554
UNBALANCE VIBRATOR
Alexandre I. Dryga, ulitsa Marata, 6, kv. 64.; Vyacheslav M. Alexeev, ulitsa Jubileinaya, 44, kv. 62., both of Kramatorsk, and Sergei A. Polovoi, ulitsa Fryazevskaya, I5, korpus 5, kv. 404., Moscow, all of U.S.S.R.
Filed Dec. 29, 1988, Ser. No. 291,778
Int. Cl.[5] F16H *33/10*
U.S. Cl. 74—87 **4 Claims**



1. An unbalance vibrator comprising:
a drive shaft;
unbalance weights in a clearance fit on said drive shaft and turnable with respect to each other,
a mechanism for adjusting the mutual position of said unbalance weights,
said mechanism made in the form of two coaxially arranged carrying members, of which one member is rigidly secured to said drive shaft, while the other member is mounted so as to be turnable and axially movable with respect to said drive shaft,
said carrying members being two cylinders inserted one into the other, said cylinders being provided with joining members to be engaged therewith,
portions of said cylinders having said joining members including grooves having a width greater than a distance between adjacent grooves.

4,928,555
AUTOMATIC TRANSMISSION FOR VEHICLES IN GENERAL
Marco Nuti, Pisa, Italy, assignor to Piaggio & C. S.p.A., Genoa, Italy
Filed Oct. 28, 1988, Ser. No. 263,949
Claims priority, application Italy, Nov. 27, 1987, 22792 A/87
Int. Cl.[5] F16H *3/02*; F16D *21/00*
U.S. Cl. 74—745 **10 Claims**



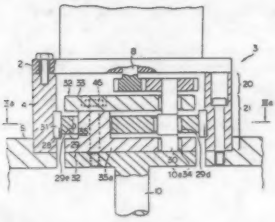
1. An automatic transmission for a vehicle comprising a first transmission unit with a transmission ratio which is variable with continuity, said first transmission unit being adapted to be connected to a driving shaft of vehicle, at least a second transmission unit and a third transmission unit, each of said second and third transmission units having a fixed transmission ratio which differ from each other, a driven side of said second and third transmission units being connected to a drive side of said first transmission unit, a drive side of said second and third transmission units being connected to a driven shaft of a vehicle to which motion is alternatively transmitted, the connection between said first transmission unit and each of said second transmission unit and said third transmission unit being through first and second coupling means each including a driving portion and a driven portion, said driving and driven portions being automatically engageable and disengageable as a function of the speed of actuation of said driving portions, the speed of actuation of said first and second coupling means driving portions differing for the engagement of the second and third transmission units, each of said second transmission unit and third transmission unit includes at least a respective first and second pair of meshed gear wheels, a first gear wheel of said first pair of meshed gears being rigidly connected to the driven portion of said first coupling means, a second gear wheel of said first pair of meshed gear wheels being connected to said driven shaft, a first gear wheel of said second pair of meshed gear wheels being rigidly connected to the driving portion of said second coupling means, and a second gear wheel of said second pair of meshed gear wheels being rigidly connected to the driven shaft.

4,928,556

ARTICULATION DRIVE APPARATUS OF INDUSTRIAL ROBOT

Kazuyuki Matsumoto, Ogaki; Masataka Hashimoto, and Michiyoshi Iwata, both of Fuwa, all of Japan, assignors to Teijin Seiki Co., Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 945,577, Nov. 17, 1986, Pat. No. 4,846,018. This application Feb. 26, 1988, Ser. No. 162,793
Claims priority, application Japan, Mar. 18, 1985, 60-53866
The portion of the term of this patent subsequent to Jul. 11, 2006, has been disclaimed.
Int. Cl.[5] F16H *1/32*
U.S. Cl. 475—149 10 Claims



1. A robot arm drive apparatus of an industrial robot comprising:

an electric motor having a drive shaft;

a first robot member having said electric motor mounted thereon,

a second robot member rotatably supported on said first robot member; and

reduction gear means for reducing rotation of said electric motor and then transmitting to said second robot member;

said reduction gear means comprising a primary reduction gear for reducing said rotation of said electric motor and a secondary, planetary reduction gear for further reducing rotation of output of said primary reduction gear;

said primary reduction gear having a predetermined reduction ratio i_1;

said secondary reduction gear comprising input shaft means having cam surface means and connected with said primary reduction gear, external gear means, an internal gear held in mesh with said external gear means and different in number of teeth from said external gear means, the external gear means being connected to said cam surface means of said input shaft means in such a manner that differential motion between said external gear means and said internal gear is developed;

said cam surface means of said input shaft means comprising a plurality of cam surfaces and said external gear means comprising a plurality of external gears;

said predetermined reduction ratio i_1 of said primary reduction gear being given by the following equation

$$0.1 < i_1 < 60 f_0 / T_f N_{max}$$

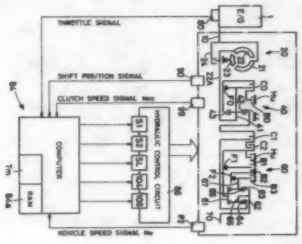
wherein f_0 indicates the natural frequency (Hertz) of a drive system comprising said electric motor, said second robot member and said reduction gear means, T_f indicates the number of torque fluctuations per one revolution in said input shaft means of said secondary reduction gear, and N_{max} indicates the maximum number of rotations (rpm) of said electric motor in the predetermined operational region thereof.

4,928,557

HYDRAULIC TRANSMISSION CONTROLLER WITH COUPLING PRESSURE COMPENSATION

Mitsuru Takada, Toyota; Tokuyuki Takahashi, Aichi, and Hiroshi Itoh, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Nov. 23, 1988, Ser. No. 275,511
Claims priority, application Japan, Dec. 4, 1987, 62-306970; Dec. 4, 1987, 62-308188
Int. Cl.[5] B60K *41/06*
U.S. Cl. 74—867 10 Claims



1. A hydraulic control apparatus for controlling a hydraulically operated frictional coupling device of an automatic transmission connected to an engine of a motor vehicle, said hydraulic control apparatus including a shift valve for effecting an engaging action of said frictional coupling device from a first position to a second position, and means for automatically controlling a control value for regulating a hydraulic pressure applied to said frictional coupling device during said engaging action, based on a parameter associated with an output of said engine, and according to a predetermined relationship bet ween said control value and said parameter, so as to reduce a shifting shock of said automatic transmission, said means for automatically controlling a control value comprising:

detecting means for detecting an engaging time during which said engaging action of said frictional coupling device from said first position to said second position is effected; and

compensating means for updating said relationship depending upon the engaging time detecting by said detecting means, with respect to a specific value of said parameter at which said engaging action takes place, said compensating means maintaining the updated relationship for use for a subsequent occurrence of said engaging action of said frictional coupling device from said first position to said second position,

said compensating means updating said relationship, with respect to an entire range of said parameter, based on said updated relationship with respect to said specific value of said paramenter, said compensating means maintaining the updated relationship with respect to said entire range of said parameter, for use for said subsequent occurrence of the engaging action.

4,928,558

TORQUE MASTER

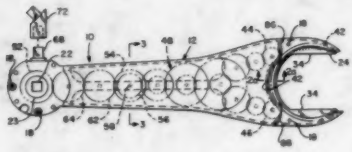
Samir B. Makhlouf, 36 Huyler Ct., Setauket, N.Y. 11733

Filed Dec. 15, 1988, Ser. No. 284,737
Int. Cl.[5] B25B *17/00*
U.S. Cl. 81—57.3 11 Claims

1. A torque multiplying wrench comprising:

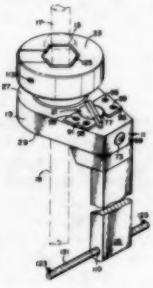
a. an elongated housing comprising a lower section and an upper section assembled to form said housing;

b. toothed jaw means within and adjacent one end of said housing exposed for engaging a member to be driven;
c. input drive means adjacent the opposite end of said housing for receiving an input driving force;
d. gear means for multiplying and delivering the torque received by said input drive means to said toothed jaw means;
e. said gear means including oppositely facing spine means within and extending down through the length of said housing means for supporting a plurality of removable posts to support gears for multiplying and delivering said torque, whereby upon removing said upper section a



failed gear or post may readily be replaced by the user of said wrench;
f. said opposite end of said housing including means to transfer reaction forces away from said wrench and to select the direction of said reaction forces; and
g. said toothed jaw means comprising a circular member with a jaw-like opening and flat side walls, side shoulders extending out from said toothed jaw means, and shoulders extending inwardly from both sections of said housing to engage said side shoulders when said toothed jaw means expands under load to limit expansion of said jaw means under load.

4,928,559
RATCHET WRENCH
Erwin H. Stielow, 1164 Glenn St., Philadelphia, Pa. 19115
Filed Nov. 9, 1987, Ser. No. 118,542
Int. Cl.[5] B25B *13/46*
U.S. Cl. 81—63 **3 Claims**



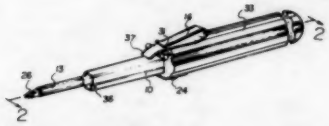
1. An offset basin ratchet wrench for loosening and tightening nuts connecting copper tubing to faucet connections comprising
a wrench body portion having a top surface and a bottom surface,
the wrench body portion having a circular hole extending between the wrench body portion top surface and the wrench body portion bottom surface,
the wrench body portion having a passageway between the circular hole and an outer front side portion of the wrench body portion,
the wrench body portion having a recess in its top surface next to and in partial contact with the circular hole,
a pawl mounted on the wrench body portion inside the recess,
pawl holding means for holding the pawl in position after the pawl has been set in a tightening position or a loosening position,
a nut driver having a hole extending through the nut driver from its top to its bottom,
the nut driver having an upper portion and a lower portion,
the hole through the nut driver in the nut driver upper portion having a hexagonal-shaped periphery for engaging a nut connecting copper tubing to a faucet connection,
the lower portion of the nut driver having a substantially circular outer periphery and having a row of teeth encircling its outer periphery that are engaged by the pawl when the lower portion of the nut driver rests inside the circular hole of the wrench body portion,
the nut driver having a main portion and a detachable wedge portion mounted on the main portion,
the nut driver having an opening extending from the top of the nut driver to the bottom of the nut driver created by detaching the nut driver wedge portion from the nut driver main portion, and
a handle attached to the bottom surface of the wrench body portion,
whereby the nut driver may be placed onto the tubing by detaching the nut driver wedge portion from the nut driver main portion, placing the nut driver main portion onto the tubing, and reattaching the nut driver wedge portion to the nut driver main portion such that the nut driver surrounds the tubing,
whereby the nut driver may then be slid into the hole in the wrench body portion after the wrench body portion has been inserted around the tubing so that the pawl engages the teeth encircling the lower portion of the nut driver, and
whereby the wrench may then be moved such that the nut is positioned inside the hexagonal-shaped portion of the hole in the nut driver,
the nut driver detachable wedge portion being detachably secured to the nut driver main portion by a pair of spring members that are mounted in bores in the nut driver main portion that engage depressions in the side walls of the nut driver wedge portion,
the spring members each having a spring that is in contact with a plug at one end and a ball at the other,
whereby the spring causes the ball to partially protrude from each of the bores and to rest in a depression in the sidewall of the nut driver wedge portion holding the nut driver wedge portion in place, and
whereby pulling outwardly on the nut driver wedge portion forces the balls into the bores so that the nut driver wedge portion may be removed.

4,928,560
POWER DRIVEN SCREW DRIVER
Kook B. Bang, 115 Bryn Mawr Ave., Newtown Square, Pa. 19073
Filed Feb. 2, 1989, Ser. No. 305,404
Int. Cl.[5] B25B *19/00*
U.S. Cl. 81—463 **10 Claims**

1. A power driven screw driver having screw means which comprises:
a hollow screw driver body;
a main spindle member disposed within said hollow screw driver body, said main spindle member including a first slot disposed in the front portion thereof for receiving a first locking member, and a first spring connected to the rear end thereof for biasing the main spindle member,
an auxiliary spindle member, in parallel to said main spindle member, disposed within said hollow screw driver body, said auxiliary spindle member operatively associated with

an auxiliary engagement which is slidably engaged in a second slot disposed in the front end portion, a third slot disposed in the rear end portion for receiving a second locking member operatively connected to a movable ball button, and a second spring connected to the rear end thereof,

a movable shank operatively associated with said main spindle member, said movable shank including a groove disposed in the rear end portion thereof for slidably engaging



the auxiliary engagement and extending a screw driver head having screw holding means, and

a lever pivotably attached to said hollow screw driver body for releasing the first locking member, whereby after pushing the movable shank while pressing the ball button and locking the main spindle member, when the first locking member is released, the main spindle member hits the movable shank for initially driving a screw held by the screw holding means into a portion of an object.

4,928,561

METHOD AND APPARATUS FOR ULTRA-PRECISE MACHINING APPLIED TO EXECUTING ATYPICAL SURFACES OF REVOLUTION AND TO SERVO-CONTROLLED MACHINING

Claude Fouche, Gasny, France, assignor to S.A.: Societe Europeenne de Propulsion, Suresnes, France

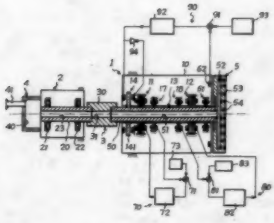
PCT No. PCT/FR87/00447, § 371 Date Aug. 31, 1988, § 102(e) Date Aug. 31, 1988, PCT Pub. No. WO88/03459, PCT Pub. Date May 19, 1988

PCT Filed Nov. 13, 1987, Ser. No. 224,778

Claims priority, application France, Nov. 13, 1986, 86 15763

Int. Cl.[5] F16C *39/06*

U.S. Cl. 82—1.11 **13 Claims**



12. Apparatus for machining typical and atypical ultra-precise surfaces of revolution, the apparatus comprising tool guide means displaceable in translation along a predetermined direction or in rotation about a predetermined axis of rotation in order to position a tool, a spindle slide for guiding a workpiece-carrier spindle assembly along an axis, first and second sensors for measuring displacement respectively of the spindle slide and of the tool guide means, and means for displacing the tool guide means at a determined speed corresponding to a given machining frequency,

wherein the workpiece-carrier assembly comprises a stator fixed to the spindle slide and a spindle mounted in the stator by means of an active magnetic suspension having five servo-controlled axes and comprising at least two radial bearings and an axial bearing, wherein the radial and axial magnetic bearings are servo-controlled at natural frequencies which are less than about 80 Hz, wherein means are provided for rotating the spindle of the assembly at a predetermined speed less than the natural frequencies and lying between about 20 Hz and about 75 Hz, and

wherein it further comprises means for applying variable reference voltages to the servo-control circuits of the radial and axial magnetic bearings, which reference voltages are varied as a function of machining control signals for the purpose of selectively modifying the radial and axial positions of the spindle of the workpiece-carrier assembly about a nominal position, and means for authorizing displacement of the spindle slide only when said control signals exceed predetermined values.

4,928,562

FILM PERFORATOR

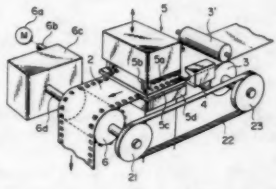
Toyokiti Tanimura, Akishima, and Masahiro Ikeda, Tama, both of Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Apr. 19, 1989, Ser. No. 340,349

Claims priority, application Japan, Apr. 20, 1988, 63-97955

Int. Cl.[5] B26F *1/02*

U.S. Cl. 83—278 **5 Claims**



1. An apparatus for perforating a photographic film comprising:

perforation means for perforating the film;

a feed roller and a pad roller for nipping the film therebetween and feeding the film at a high speed to the perforation means;

means for advancing the film from the perforation means, the advancing means comprising a sprocket for engagement with the film perforations, the sprocket being coupled to the feed roller for conveying the film in synchronization with the sprocket, and the advancing means including means for maintaining the speed of the sprocket higher than the speed of the feed roller for producing a backward tension on the film.

4,928,563

ELECTRONIC TUNING APPARATUS FOR AN ELECTRONIC STRINGED MUSICAL INSTRUMENT

Yoshiyuki Murata, Tachikawa, and Hajime Manabe, Higashiyamato, both of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

Filed Dec. 28, 1988, Ser. No. 290,981

Claims priority, application Japan, Dec. 31, 1987, 62-332196; Oct. 20, 1988, 62-262919

Int. Cl.[5] G10G *7/02*; G10H *3/18*

U.S. Cl. 84—726 **47 Claims**

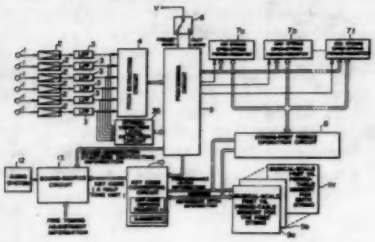
45. An electronic tuning apparatus for a stringed instrument, comprising:

extracting means for extracting a fundamental period data of a string vibration which is supplied thereto;

measuring means for measuring a tension state of said string based on the fundamental period data which is extracted by said extracting means prior to a musical performance; and

converting means for converting said fundamental period

data which is extracted during the musical performance by said extracting means into a corresponding tuned tone



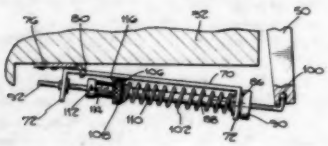
pitch data in accordance with said tension state measured by said measuring means.

4,928,564

APPARATUS AND METHOD FOR STABILIZING A TREMOLO ON A MUSICAL INSTRUMENT SUCH AS A GUITAR

David J. Borisoff, 22119 Victory Blvd., Canoga Park, Calif. 91303, and Boris Borisoff, 5403 Bianco Ave., Woodland Hills, Calif. 91367

Filed Aug. 22, 1988, Ser. No. 234,886
Int. Cl.[5] G10D *3/12*
U.S. Cl. 84—313 8 Claims



1. A stabilizer device for use with a tremolo on a guitar having a bridge assembly with a sustain lever arm, comprising in combination:

an elongated bracket member adapted to provide a pivotal connection at one end to a guitar body;

a pull rod carried by said bracket member, movable relative thereto, and adapted to be connected at one end to the bridge assembly lever arm;

said bracket member providing a first stop adjacent to said one end of said pull rod;

a tube sleeved over said pull rod and having a tube nut at one end cooperable with said first stop in one position of the lever arm;

an adjustable collar fixed to said pull rod adjacent the other end of said tube and adapted to abut said other end of the tube to provide a second stop at a selected adjustable distance from the lever arm;

and a main spring means on said tube biasing said tube nut against said first stop;

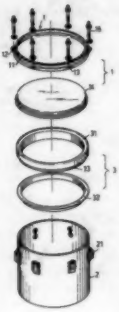
whereby said first and second stops determine a neutral position of said lever arm.

4,928,565

MUSICAL DRUM WITH PRESSURE BUFFER ELEMENT

Wu H. Hsieh, No. 178, Chung Shan Erh Rd., Lu Chou Hsiang, Taipei Hsien, Taiwan

Filed Sep. 12, 1989, Ser. No. 406,400
Int. Cl.[5] G10D *13/02*
U.S. Cl. 84—411 R 1 Claim



1. A musical drum with a buffer element substantially comprising drumface (1), a wooden drum body (2) and a buffer element (3), wherein:

said buffer element (3) is disposed between said drum face (1) and said wooden drum body (2);

said drum face (1) comprises a drumhead (14) and a rim (11) for the purpose of clamping said drumhead (14) to said buffer element (3); said rim (11) further comprises an outer lip on which is disposed a plurality of equally spaced tabs (12); through each respective tab (12) is a hole (13) through which a respective clamping screw (15) is passable; said buffer element (3) comprises a metal ring (31) on the outside bottom edge of which is cut a concavity (32) for receiving a brim of the drum body (2); said buffer element (3) further comprises a flexible washer (32) which fits into the concavity (31) and is disposed between the metal ring (31) of the buffer element (3) and said brim of the drum body (2); a downward pressure exerted on the buffer element (3) by the stretching of the drumhead (14) across said buffer element, due to the tightening of said clamping screws (15) is absorbable by said flexible washer (32) thereby preventing deformation of the wooden drum body (2).

4,928,566

DEVICE FOR APPLYING TENSION TO A PAIR OF DRUM HEADS

Mitsuo Yanagisawa, Yachiyo, Japan, assignor to Pearl Musical Instrument Co., Tokyo, Japan

Filed May 15, 1989, Ser. No. 352,103
Claims priority, application Japan, Oct. 20, 1988, 63-136139[U]
Int. Cl.[5] G10D *13/02*
U.S. Cl. 84—413 6 Claims

1. A tightening device for applying tension to a pair of drum heads individually covering two opposite end openings of a drum shell open at both ends in the axial direction and having first holes, comprising:

a pair of hoops arranged along the respective edges of the drum heads, each said hoop having second holes arranged circumferentially at regular intervals;

tension bolts, each including a shank portion having an external thread, said shank portion being passed through each corresponding second hole;

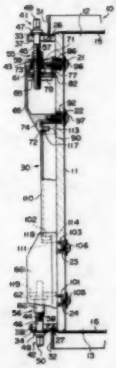
nuts, each including a cylinder portion and a flange situated at one end thereof, said cylinder portion having an inter-

nal thread mating with the external thread of each corresponding tension bolt;

a pair of metallic lug bodies formed by casting, each said lug body being in the form of a box open on the drum shell side and having first and second ends situated opposite each other, said first end having a first opening in which the cylinder portion of each corresponding nut is inserted, and said second end having a second opening, said first and second openings extending in the axial direction of the drum shell;

first projections, each located in the vicinity of the first end of each said lug body and adapted to be inserted into the first hole of the drum shell, each said first projection having a tapped hole,

second projections, each located in the vicinity of the second end of each said lug body and projecting toward the drum shell;



rotation preventing means inside each said lug body for preventing each said nut from rotating;

first screws screwed individually in the tapped holes of the first projections of the lug bodies, said lug bodies being adapted to be fixed to the drum shell as the screws are screwed into the tapped holes; and

a connecting member for connecting the paired lug bodies, said connecting member having a longitudinal axis extending in the axial direction of the drum shell and two opposite end portions fitted individually in the second openings of the lug bodies, the cross section of said connecting member, with respect to the direction perpendicular to said longitudinal axis, being uniform throughout the axial length, each said opposite end portion of said connecting member having a third hole in which the second projection of each corresponding lug body is fitted.

4,928,567

CLUTCH UNIT FOR HIGH-HAT CYMBALS

Makoto Kurosaki, Hamamatsu, Japan, assignor to Yamaha Corporation, Japan

Filed Jul. 6, 1989, Ser. No. 375,890

Claims priority, application Japan, Jul. 14, 1988, 63-93130[U]

Int. Cl.[5] G10G *5/00*

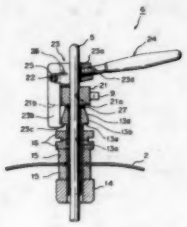
U.S. Cl. 84—422.3 **1 Claim**

1. A clutch unit for a high-hat cymbal, in which a lower cymbal plate is mounted atop a vertical post, an extension rod is idly inserted through said post and normally elastically urged to move upwards and an upper cymbal plate is mechanically connected to said extension rod via said clutch unit for selective percussive contact with said lower cymbal plate, comprising

a clutch bolt idly inserted over said extension rod in fixed connection to said upper cymbal plate and provided with a depression,

a holder secured to said extension rod above said clutch bolt,

a hook block pivoted to said holder, and provided with at



least one hook engageable with said depression in said clutch bolt and a clutch lever substantially horizontally fixed thereto, and

means for elastically holding said hooking in engagement with said depression.

4,928,568

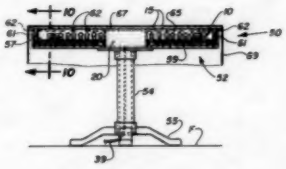
COLOR ORGAN DISPLAY DEVICE

Donald E. Snavely, 210 N. Hoover Ave., New Holland, Pa. 17557

Filed Apr. 12, 1989, Ser. No. 337,153

Int. Cl.[5] A63J *17/00*

U.S. Cl. 84—464 R **14 Claims**



1. In a table having a tabletop supported above the floor by a support apparatus engagable with the floor, the improvement comprising:

a color organ display device forming a base member of said tabletop and being positioned beneath a top cover operable to permit the passage of light energy emanating from said color organ display device, which has a plurality of light bulbs arranged in groups of like color; and

a color organ operably associated with said display device for receiving an audio input signal from a source of sound and effecting an illumination of said groups of light bulbs in response to said audio input signal.

4,928,569

ENVELOPE SHAPE GENERATOR FOR TONE SIGNAL CONTROL

Masaki Kudo, and Hideo Suzuki, both of Hamamatsu, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan

Filed Nov. 13, 1987, Ser. No. 120,071

Claims priority, application Japan, Nov. 15, 1986, 61-272672; Nov. 15, 1986, 61-272673

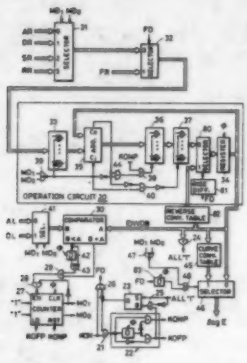
Int. Cl.[5] G10H *7/00, 1/02, 5/00*

U.S. Cl. 84—626 **25 Claims**

1. An envelope shape generator having a rapid attenuation capability comprising:

envelope shape forming means for forming envelope shape data for controlling a tone signal in the form of data in decibel representation; and

rapid attenuation means operative within a rapid attenuation period during which rapid attenuation is desired for rapidly attenuation the envelope shape data in decibel repre-



sentation with such a characteristic that inclination of attenuation becomes increasingly steeper to achieve rapid attenuation.

4,928,570

METHOD AND SYSTEM FOR TRANSMITTING A COMMAND TO START UP A DEVICE ON BOARD A MISSILE

Jacques Esterlin, Checy; Guy Le Parquier, Paris, and Jean Pierre Roux, St. Cyr En Val, all of France, assignors to Thomson Brandt Armements, Boulogne Billan Court, France

Continuation of Ser. No. 69,987, Jul. 6, 1987, abandoned. This application Jan. 24, 1989, Ser. No. 300,228

Claims priority, application France, Jul. 8, 1986, 86 09892

Int. Cl.[5] F42C *11/06, 15/06*

U.S. Cl. 89—6.5 **3 Claims**

3. A system for starting up a device placed in a missile launched from a carrier system, comprising:

a control wire for receiving from said carrier system temporal data specifying a predetermined time period after launch of said missile which must elapse before the start up of said device, and a missile firing command signal;

a first filter connected to said control wire for passing said temporal data;

a memory, connected to said control wire via said first filter, for storing said temporal data;

a timing unit which begins a timing operation upon receipt of said missile firing command signal;

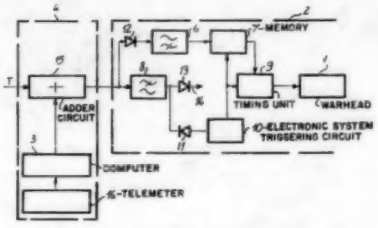
a second filter connected to said control wire for passing said missile firing command signal and said temporal data, an output of said second filter being applied to a firing command signal input of said missile;

an electronic system triggering circuit, connected to said output of said second filter, for starting the timing operation has commenced for the predetermined time period specified by said stored temporal data;

a first diode connected between said second filter and said electronic system triggering circuit so as to pass only negative pulses of said temporal data to said electronic system triggering circuit for triggering said memory and said timing unit,

a second diode connected between said control wire and said first filter for passing only a positive pulses of said temporal data to said first filter, and

a third diode connected to said output of said second filter to pass only positive pulses to said firing command signal input of said missile.



4,928,571

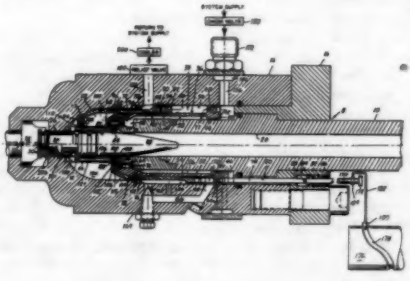
LIQUID PROPELLANT GUN

Melvin J. Bulman, Shelburne, Vt., assignor to General Electric Company, Pittsfield, Mass.

Continuation of Ser. No. 840,074, Oct. 6, 1977, abandoned. This application Aug. 10, 1989, Ser. No. 403,275

Int. Cl.[5] F41F *1/04*

U.S. Cl. 89—7 **29 Claims**



25. A liquid propellant gun comprising:

a combustion chamber extending longitudinally into the firing bore of a gun barrel;

a first conduit outlet means for providing liquid propellant into said combustion chamber;

means for igniting liquid propellant from said first conduit outlet means to provide a longitudinally forward flow of combustion gas through said combustion chamber and firing bore; and

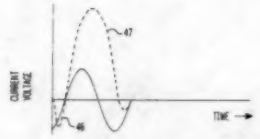
a second conduit outlet means, longitudinally forward of said first conduit outlet means, for providing liquid propellant into said combustion chamber including means in conjunction with said flow of combustion gas for deflecting the flow of liquid propellant longitudinally forwardly as a surface film along the inner wall of said combustion chamber and firing bore.

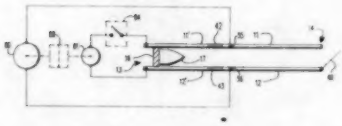
4,928,572

PULSED AC ELECTROMAGNETIC PROJECTILE LAUNCHER APPARATUS

Dennis J. Scott, Jeannette, and Raymond M. Calfo, Murrysville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 17, 1989, Ser. No. 339,339
Int. Cl.[5] F41F 1/02
U.S. Cl. 89—8 **5 Claims**





1. Electromagnetic projectile launcher apparatus, comprising:

(A) a pair of generally parallel conductive launcher rails having a breech end and a muzzle end;

(B) said rails including a high current connection at a location intermediate said ends;

(C) said rails including a high resistance portion disposed between said high current connection and said breech end;

(D) an armature for conducting current between said rails for propelling a projectile along said rails, said armature being initially located near said breech end;

(E) pulsed AC generator means having first output terminals for providing a relatively high current pulse, and second output terminals for providing a relatively low current pulse;

(F) means connecting said first output terminals to said high current connection;

(G) means including switch means connecting said second output terminals to said breech end;

(H) said pulsed AC generator means and said switch means being constructed and arranged to deliver said lower current pulse just prior to said higher current pulse to initially accelerate said armature past said high resistance portion whereupon said high current pulse delivered to said current connection will accelerate said armature to its desired exit velocity.

4,928,573

SILENCER FOR SABOTED PROJECTILES

Kevin S. Fansler, Harre'de Grace, and David H. Lyon, Forest Hill, both of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

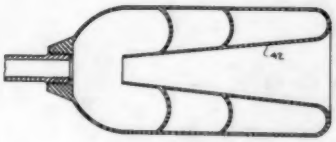
Filed Oct. 26, 1988, Ser. No. 262,656
Int. Cl.[5] F41F 17/12
U.S. Cl. 89—14.4 **4 Claims**

1. A silencer for a gun which fires a saboted projectile comprising:

a casing which defines a chamber of the silencer through which the saboted projectile passes when fired from the gun, the chamber having an axis, a rear projectile entrance hole, and a front projectile exit hole, both the entrance hole and the exit hole being disposed on the chamber axis;

means for securing the casing to the gun barrel so that the chamber axis coincides with the gun barrel axis, the gun barrel closes the chamber entrance hole, and the axial distance between the gun muzzle and the exit hole is less than the axial length of the saboted projectile;

wherein the casing defines a truncated exit cone whose smallest diameter is the chamber exit hole, the diameter of



the chamber exit hole and shape of the exit cone being selected so that no sabot part will impinge upon the casing as the sabot components separate from the projectile, and the silencer chamber includes an annular front portion surrounding the exit cone;

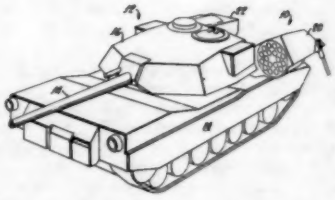
at least one annular perforated baffle extending around the exit cone in the front portion of the chamber.

4,928,574

AMMUNITION MAGAZINE SYSTEM

Michael D. Golden, Corona del Mar, Calif., assignor to Western Design Corporation, Irvine, Calif.

Filed Oct. 5, 1987, Ser. No. 104,786
Int. Cl.[5] F41F 9/06
U.S. Cl. 89—34 **17 Claims**



1. An ammunition magazine system for a large caliber gun installed on a vehicle, said gun being mounted for loading from inside the vehicle, said ammunition magazine system comprising:

magazine means for supporting a plurality of ammunition rounds comprising a plurality of attached modular canisters, each modular canister being configured for supporting an ammunition round and having means for attaching each modular canister to other modular canisters to form a monocoque structure, said means for attaching each modular canister to other modular canisters comprising means for aligning the attached modular canisters in a circular array about a centerline of the ammunition magazine;

means attaching the magazine means to the vehicle for enabling the magazine means to be moved from a first posi-

tion, at which ammunition rounds can be removed from the magazine means from within the vehicle, to a second position, at which ammunition rounds can be inserted into the magazine means from outside the vehicle, said means attaching the magazine means to the vehicle comprising hinge means for enabling the magazine to be rotated from the first to the second position; and

means for separating the magazine means from the vehicle when the magazine means is in the second position.

4,928,575

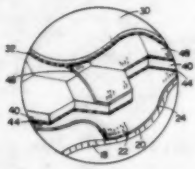
SURVIVABILITY ENHANCEMENT

Martin E. Smirlock, Concord; William A. Ribich, Lexington; Paul J. Marinaccio, East Orleans, all of Mass., and Bernard E. Sawaf, Nashua, N.H., assignors to Foster-Miller, Inc., Waltham, Mass.

Filed Jun. 3, 1988, Ser. No. 202,218

Int. Cl.[5] F41H *7/04*

U.S. Cl. 89—36.02 **19 Claims**



1. A survivability enhancement system for use on a vehicle that has a surface to which armor is to be releasably applied, comprising

separable fastener structure of a first type fixed on said surface of said vehicle whose survivability is to be enhanced, and

an array of armor tile elements for providing a composite supplementary layer of armor, each said armor tile element having a complementary surface that corresponds to said surface of said vehicle, and

separable fastener structure of a second type and complementary to said first type separable fastener structure secured to said armor tile array, one of said separable fastener structures having a multiplicity of hooking elements and a cooperating other said fastener structure having complementary structure that is in releasable interengagement with said hooking elements, each said tile having perimeter surface portions in mating juxtaposition with perimeter surface portions of adjacent tiles to provide a composite supplementary armor layer on said vehicle, said survivability enhancement system having energy absorbing characteristics and providing progressive energy dissipation of energy resulting from impact of a ballistic missile on an armor tile element of said array such that an adjacent tile element that is not directly impacted by said ballistic missile but is subjected to lateral force, remains attached to said surface of said vehicle due to reengagement with said complementary structure by said hooking elements associated with said adjacent tile element that release from said complementary structure under influence of said lateral force.

4,928,576

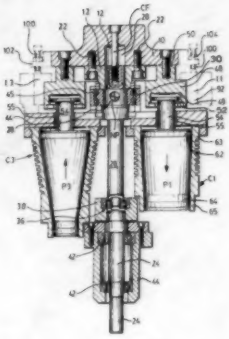
COMPRESSED GAS MOTOR

Richard J. Armstrong, 1216 Yonge Street, Suite 102, Toronto, Ontario, Canada (M4T 1W1)

Continuation-in-part of Ser. No. 31,358, Mar. 30, 1987, Pat. No. 4,852,418. This application Apr. 28, 1988, Ser. No. 187,362

Int. Cl.[5] F01B *3/02*; F16J *1/00*

U.S. Cl. 91—499 **16 Claims**



9. Compressed gas engine with nutating drive for an output rotating shaft defining a rotating axis, including:

at least three piston-cylinder sets, each set comprising relatively reciprocal piston and cylinder each defining a reciprocation axis having its major component parallel to the rotation axis,

a nutation frame mounted to nutate about a nutation point,

said mounting allowing sufficient universal movement for said frame to nutate under activation of said pistons,

connections between the movable component of said piston-cylinder sets and said frame angularly disposed about said nutation point relative to said rotary axis,

said connections allowing coupling of the reciprocating action of said pistons to cause nutation of the nutation frame, whereby operation of said pistons in selected phase relationship causes nutation of said frame,

a rod projecting from said frame to a location spaced in an axial direction, relative to said axis of shaft rotation from said nutation point,

a crank on said output shaft connected to said rod at said location to allow relative rotation about the axis of said rod, whereby said rod causes rotation of said output shaft,

each of said at least three piston-cylinder sets comprising a piston tapering in said reciprocation direction at an angle of less than 45° thereto and a means defining a complementary shaped cylinder,

whereby during reciprocation of said piston a variable volume chamber is defined between said piston and cylinder, wherein the wall are defining said chamber is mainly composed of tapering piston and chamber walls,

means for admitting gas at a higher pressure to and allowing the escape of compressed gas at a lower pressure from said cylinders at times to produce operation of said piston in said selected phase relationship,

wherein a stem of a uniform cross section in the reciprocation direction projects from the narrow end of the tapering walls of said piston, and the material defining the chamber walls is shaped to provide a bore complementary to said stem, said stem and said bore being so arranged that a portion of said stem remains in said bore in the extended position of said piston.

4,928,577

PISTON AND CYLINDER UNIT

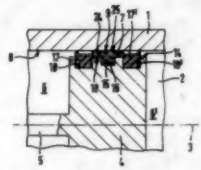
Kurt Stoll, Lenzhalde 72, 7300 Esslingen, Fed. Rep. of Germany

Filed Aug. 22, 1988, Ser. No. 235,386

Claims priority, application Fed. Rep. of Germany, Sep. 17, 1987, 3731158

Int. Cl.[5] F16J *1/00*

U.S. Cl. 92—177 **15 Claims**



1. A piston and cylinder unit comprising a cylinder barrel defining a piston space, a piston with a non-circular cross section able to run axially in said barrel with a support action due to a peripheral bearing surface of the barrel, said piston including at least one annular runner belt arranged on said piston extending along at least part of the length of the piston, said belt being coaxially arranged thereon along part of the length of the piston, said belt having a surface facing radially outwardly which makes contact with the inner bearing surface of the barrel with sliding fit to support the piston, an inwardly directed surface of the belt bearing on an outer peripheral surface of the piston, said outer peripheral surface of the piston being spaced from the bearing surface of the barrel, said belt further having an inwardly directed retainer spur fitting into a groove-like peripheral recess in the piston, said belt being made of a material with resiliently elastic properties and being interrupted at one position on its periphery.

4,928,578

PISTONS WITH BEARING MEMBERS

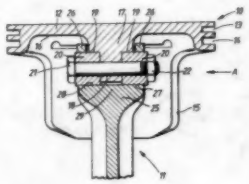
Michael L. P. Rhodes, Rugby, England, assignor to AE PLC, Rugby, England

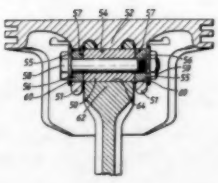
Filed Nov. 23, 1987, Ser. No. 123,786

Claims priority, application United Kingdom, Dec. 5, 1986, 8629207

Int. Cl.[5] F16J *1/14*; F22B *5/00*

U.S. Cl. 92—187 **6 Claims**





1. A piston comprising a crown portion and a skirt portion, the crown position having a single boss depending from the underside thereof, said boss including two generally axially extending faces, said faces each having a rebate formed therein, said boss having secured thereto, in fixed relationship to the piston body, two cylindrical bearing members, one said bearing member located in each of said rebate, and which bearing members cooperate with the small end of an associated connecting rod so as to transmit combustion firing loads to said connecting rod substantially in compression while providing bearing surfaces for relative oscillating movement between the piston and connecting rod.

4,928,579

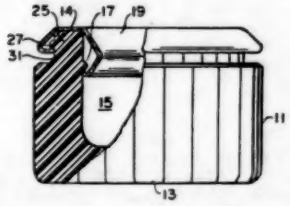
PISTON FOR DISC BRAKES

John E. Emmett, Farmington Hills, Mich., assignor to Occidental Chemical Corporation, Niagara Falls, N.Y.

Continuation-in-part of Ser. No. 293,645, Aug. 17, 1981, abandoned, which is a continuation-in-part of Ser. No. 270,731, Jun. 5, 1981, Pat. No. 4,401,012, which is a continuation-in-part of Ser. No. 202,510, Oct. 31, 1980, abandoned. This application Apr. 8, 1985, Ser. No. 720,782

Int. Cl.[5] F16J *1/00*

U.S. Cl. 92—248 **20 Claims**



1. A composite vehicular brake piston for activating a vehicular brake shoe during braking of a vehicle comprised of a cylindrical resin body having an open end and a closed end and a metallic cap extending over the end wall of said open end and secured to said body by an anchoring means positioned within the open end of said body, wherein said metallic cap has means for engaging a vehicular brake shoe or brake shoe assembly so that the brake shoe moves in unison with the piston during braking and debraking of the vehicle.

4,928,580

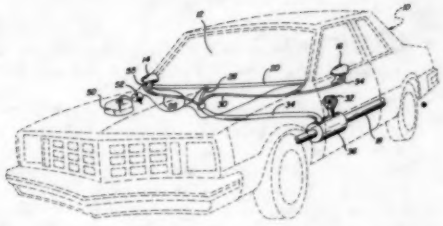
AUTOMOBILE WINDSCREEN CLEANING SYSTEM

Keith W. McIntyre, Tigard, Oreg., and Scott J. McIntyre, Fort Meyers, Fla., assignors to H. Novis Inc., Auburn Hills, Mich.

Filed Jan. 27, 1989, Ser. No. 302,371

Int. Cl.[5] B60S *1/54*

U.S. Cl. 98—2.1 **16 Claims**



1. For use in combination with the windscreen of an automotive vehicle:

an elongate, flexible body adapted to be adhesively mounted on and extending across the lower extension surface of said windscreen and having a lower portion defining a plenum, said body further having an upper portion contiguous with said lower portion which, in combination with said windscreen surface, defines a continuous lineal nozzle extending across a substantial area of the windscreen;

a plurality of spaced-apart spacer means bonded to and between said upper portion and said windscreen surface for mounting the body on the windscreen with the upper portion in substantially uniformly spaced relation to the outer surface of the windscreen to direct air at high velocity from the plenum across the windscreen surface; and

means for supplying air under pressure to the plenum such that the air directed from the nozzle portion flows at high velocity across the windscreen surface.

4,928,581

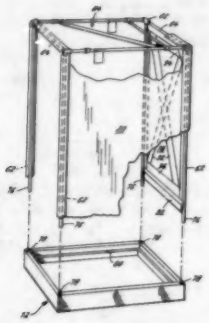
NEGATIVE AIR CONTROL UNIT AND CLOSURE STRUCTURE

Earl B. Jacobson, 510 S. Shore Dr., Crystal Lake, Ill. 60014

Filed Nov. 30, 1988, Ser. No. 277,772

Int. Cl.[4] F24F *7/00*

U.S. Cl. 98—1.5 **11 Claims**



1. A door closure structure for utilization in negative air control modules having walls and a base, said structure comprising:

a structure door frame having an inner peripheral edge and an outer periphery including at least one wall attaching means sealingly secured thereto around said periphery, said attaching means are zipper means and include an outer sealing flap over said zipper means;

a door panel mounted to said frame, including a rectangular frame having an outer peripheral edge and a fabric covering sealingly secured to said rectangular frame and extending beyond said inner peripheral edge, to seal against said structure door frame; and

said door frame including means for mounting said structure door frame into the base.

4,928,582

NOZZLE FOR DISCHARGING VENTILATION AIR FROM A VENTILATION SYSTEM

Sven E. Elfverson, Mullsjö , Sweden, assignor to Saab-Scania Aktiebolag, Sweden

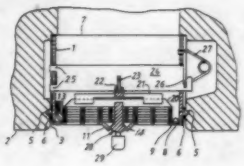
PCT No. PCT/SE87/00432, § 371 Date Mar. 29, 1989, § 102(e) Date Mar. 29, 1989, PCT Pub. No. WO88/02319, PCT Pub. Date Apr. 7, 1988

PCT Filed Sep. 25, 1987, Ser. No. 339,614

Claims priority, application Sweden, Sep. 29, 1986, 8604094

Int. Cl.[5] B60H *1/34;* F24F *13/12*

U.S. Cl. 98—2 **25 Claims**



1. A nozzle for discharging ventilation air from a ventilation system, comprising:

(A) a housing with a through-flow duct for conducting the ventilation air through said housing;

(B) a plurality of relatively displaceable plates across said duct, said plates being disposed over one another and being oriented generally parallel, said plates each having a hole therethrough for air flow, said holes being arranged over said plates to that said holes in said plates coact to form a ventilation duct for conducting ventilation air through said through-flow duct of said housing, said plates being displaceable transverse to said through-flow duct to move their said holes to change the flow direction of the ventilation air;

(C) guide means for preventing adjacent said plates from turning with respect to each other and for permitting said adjacent plates to shift in a direction transverse to said through-flow duct with respect to each other, said guide means including guide members defined on each of said plates, said guide members being shaped and placed so that said guide members of adjacent said plates cooperate to prevent said turning and to permit said shifting; and

(D) means engaging said plates for displacing them with respect to each other for redirecting air flow.

4,928,583

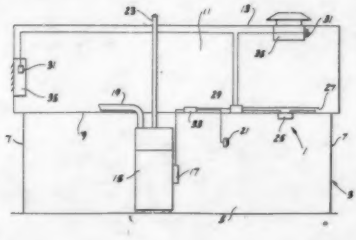
AIR FLOW CONTROL SYSTEM

Harry L. Taylor, and Charles O. Ehret, both of 54 Buckley Meadows Dr., St. Louis, Mo. 63125

Filed Jul. 22, 1988, Ser. No. 222,956

Int. Cl.[5] F24F *11/02*

U.S. Cl. 98—31.6 **12 Claims**



1. An air flow control system for controlling the air flow

within a building having a blower for circulating the air in the building, the system comprising:

means for venting air out of the building;

means for detecting fire, smoke, or high heat in the building;

means for closing the venting means upon the detection of fire, smoke, or high heat in the building connected to the detecting means; and

means for disabling the blower to stop recirculation of the air upon the detection of fire, smoke, or high heat in the building connected to the detection means.

4,928,584

INFUSER

Michael J. R. Young, Ashburton, England, assignor to General Dispensing Systems Limited, Croydon, England

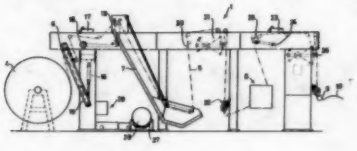
PCT No. PCT/GB88/00326, § 371 Date Dec. 27, 1988, § 102(e) Date Dec. 27, 1988, PCT Pub. No. WO88/08268, PCT Pub. Date Nov. 3, 1988

PCT Filed Apr. 27, 1988, Ser. No. 294,484

Claims priority, application United Kingdom, Apr. 28, 1987, 8710045

Int. Cl.[5] A47J *31/00*

U.S. Cl. 99—289 T **9 Claims**



1. An infuser comprising a movable continuous mesh belt, roller means around which said mesh belt may pass, means to cause movement of the belt, means to deposit infusible solid and infusing liquid onto the mesh belt, collection means below the mesh belt to collect the infusion, contact means contacting the mesh belt, and ultrasonic vibration generating means connected to said contact means to impart ultrasonic vibration to the mesh belt to aid cleaning thereof.

4,928,585

METHOD FOR CONTROLLING THE PASSAGE OF FABRIC THROUGH A ROTARY SCREEN PRINTING INSTALLATION

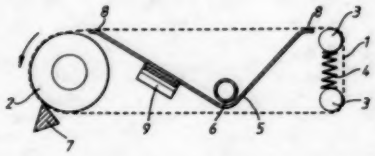
Gerardus H. van Mondfrans, Sambeek, and Pieter de Vries, Boxmeer, both of Netherlands, assignors to Stork Brabant B.V., Boxmeer, Netherlands

Filed Oct. 6, 1988, Ser. No. 254,164

Claims priority, application Netherlands, Oct. 9, 1987, 8702409

Int. Cl.[5] B41F *15/12*

U.S. Cl. 101—129 **5 Claims**



1. A method for controlling the passage of a fabric through a rotary screen printing installation, whereby a web of substrate to be printed upon is wound from a first stock roll via a wind-off roller and fed to a printing machine of the installation, and the substrate is then fed through a drying installation and wound up, comprising the steps of:

A. feeding a leader, a pre-determined length of a fabric of low quality, into the installation, a portion of said leader being stored in a buffer,

B. sewing the substrate to be printed to said leader,

C. storing the length of a print order in a memory of an electronic processing unit,

D. setting the printing machine using said leader, while emptying the buffer,

E. starting the intake of substrate at a low speed,

F. sending to the processing unit a signal for measuring the length of the strength fed in when the seam between the leader and the substrate passes the wind-off roller,

G. sending to the processing unit a signal for measuring the length of the printed substrate of a first quality after the seam between the leader and the substrate has passed through the printing machine and after the printing machine is set to a first quality,

H. comparing the measured length of substrate of first quality with the length of the print order stored in the memory.

4,928,586

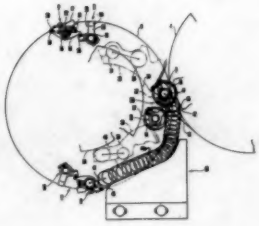
SHEET REVERSING UNIT FOR SHEET PRINTING PRESS

Kenji Kida, Ibaraki, Japan, assignor to Kormori Printing Machinery Co., Ltd., Japan

Continuation of Ser. No. 178,772, Mar. 31, 1988, abandoned, which is a continuation of Ser. No. 15,976, Feb. 18, 1987, abandoned. This application Jul. 13, 1989, Ser. No. 380,725

Int. Cl.[5] B41F *21/04, 21/10*

U.S. Cl. 101—230 **3 Claims**



1. A sheet reversing unit for a sheet printing press, said sheet reversing unit comprising:

a sheet reversing cylinder rotatably mounted to a sheet printing press frame, said sheet reversing cylinder having a peripheral surface and at least one notch in said peripheral surface;

means mounted to said sheet printing press frame for rotating said sheet reversing cylinder;

first and second reversing cam surface means attached to said sheet printing press frame, said first reversing cam surface means having smaller and larger diameter portions concentric with said sheet reversing cylinder and cam surface portions of upwardly and downwardly inclined surfaces therebetween;

reversing gripper means pivotally mounted in said at least one notch of said sheet reversing cylinder for gripping a sheet, said reversing gripper means further comprising:

at least one sheet reversing gripper;

a gripper opening and closing can means mounted to said sheet printing press frame in spaced relationship to said sheet reversing cylinder; and

at least one gripper opening and closing cam follower means mounted in spaced relationship to said gripper opening and closing cam means to open and close said at least one sheet reversing gripper;

reversing cam follower means mounted to said sheet reversing cylinder, said reversing cam follower means being

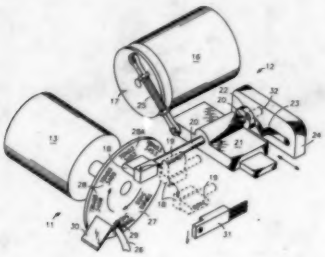
brought into contact with said first reversing cam surface means for pivoting said reversing gripper means;
suction lever means pivotally mounted in said at least one notch of said sheet reversing cylinder for holding said sheet by suction;
means for providing suction to said suction lever means;
suction lever cam follower means mounted to said sheet reversing cylinder, said suction lever cam follower means being brought into contact with said second reversing cam surface means for pivoting said suction lever means; and
regulating cam means attached to said sheet printing press frame for regulating said reversing cam follower means, said regulating cam means having a cam surface in spaced relationship to said opening and closing cam follower means, whereby said opening and closing cam follower means and said regulating cam means selectively cooperate to ensure the pivoting movement of said at least one sheet reversing gripper as said reversing cam follower means travels along said first reversing cam surface means from said larger diameter portions and along said downwardly inclined surface of said cam surface portions such that said reversing cam follower means is maintained in engaging contact with said first reversing cam surface means.

4,928,587

PROGRAMMABLE PAD PRINTER

Douglas L. Glover, Scottsdale, Ariz., assignor to Motorola Inc., Schaumburg, Ill.

Continuation of Ser. No. 160,974, Feb. 26, 1988, abandoned. This application Jul. 3, 1989, Ser. No. 373,704
Int. Cl.[5] B41F *17/00*
U.S. Cl. 101—42 **4 Claims**



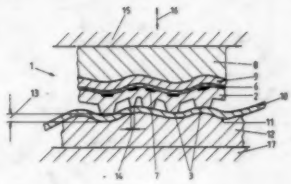
1. A programmable pad printer comprising:
programmable selecting means for selecting a designated mark from a plurality of marks;
ink means for supplying ink to said programmable selecting means;
a device to be marked;
printing means for transferring said designated mark from said programmable selecting means to said device;
wherein said programmable selecting means comprises:
a mark containing device having a surface containing a plurality of marks thereon;
first driving means for driving said mark containing device;
control means for controlling said first driving means; and
wiping means for wiping an excess of ink from said mark containing device;
wherein said printing means comprises:
a print head; and
second driving means for driving said print head between said programmable selecting means and said device;
wherein said second driving means comprises:
a shaft having a first end coupled to said print head and a second end;
a slide defining an opening therein through which said shaft is disposed;
a cam being coupled to said second end of said shaft;
a pin extending from said cam opposite said shaft;
a cam guide block defining an opening in which said pin is slideably disposed; and
a motor coupled to said slide.

4,928,588

APPARATUS FOR DRY PRINTING ONTO A WORKPIECE USING A HOT EMBOSSING FILM AND AN EMBOSSING DIE

Walter Mathis, Feldheim 1, CH - 6312 Steinhausen, Fed. Rep. of Germany

Filed Jan. 30, 1989, Ser. No. 303,753
Claims priority, application Fed. Rep. of Germany, Feb. 1, 1988, 3802885; Aug. 30, 1988, 3829297
Int. Cl.[5] B41F *17/00*
U.S. Cl. 101—9 **19 Claims**



1. Apparatus for dry printing onto a workpiece, comprising:
a hot embossing film and an embossing die with a die face;
means for moving the workpiece and said embossing die together under heat and pressure over time;
means for intermediate clamping of said hot embossing film to hold the workpiece and said embossing die in contact so that heat is transferred and then removed for said hot embossing film to adhere onto the workpiece corresponding to said embossing die;
means for releasing said film from the workpiece after a cooling period;
a receiving station for the workpiece;
synchronized feeding means for feeding said hot embossing film;
means for heating said embossing die, said embossing die being a die body of elastically formable material;
said die body having a wall thickness so that a side of said die body facing away from the die face has projection means forming a positive force transfer relief as said die body is placed onto the workpiece to be printed and forms locally and elastically onto the workplace surface;
said relief corresponding substantially to said die face;
an elastic pressure pad on a side of said die body facing away from said die face to form said die body locally and elastically.

4,928,589

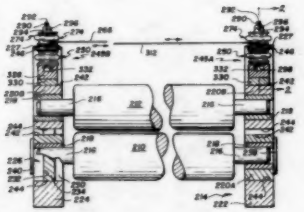
SQUEEZE ROLL AND ACTUATOR ASSEMBLY UTILIZING INFLATABLE BAGS

Robert C. Schofield, 5520 Melton Rd., Portage, Ind. 46368

Filed Jun. 14, 1988, Ser. No. 206,347
Int. Cl.[5] B30B *3/04*
U.S. Cl. 100—170 **19 Claims**

1. A roll assembly for sheet material comprising a support structure adapted to be disposed on a horizontal surface, said support structure defining a pair of spaced confronting keyways extending vertically upward from a lower end thereof, a first bearing block mounted in a fixed position on the support structure at the lower end of one of the keyways and a second bearing block mounted in a fixed position on the support structure at the lower end of the other of the keyways, a first roll having a central axis of elongation journaled at opposite ends on the first and second bearing blocks, a third bearing block translatably keyed within the one keyway and a fourth bearing block translatably keyed within the other keyway of the pair of keyways, a second roll having a central axis of elongation

journaled at opposite ends on the third and fourth bearing blocks, the axes of elongation of the first and second rolls being disposed in a vertical plan, the third and fourth bearing blocks and the second roll forming an assembly translatable in the keyways and movable with respect to the first roll, an actuator having a first support bar extending across the one keyway of the pair of keyways above the third bearing block and mounted on the support structure, said bar having an underside confronting the third bearing block and an upperside opposite the underside, said actuator having a first bag having opposite ends and a flexible elastic wall extending between ends thereof defining a first cavity, one end of the first bag being mounted in a fixed position on the underside of the bar and extending toward the third bearing block, means connecting the other end of the first bag to the third bearing block, a second bag



having opposite ends and a flexible elastic wall extending between the ends thereof defining a second cavity, one end of the second bag being mounted on the upper side of the bar and the second bag extending away from the third bearing block, a mechanical linking member attached to the other end of the first bag and coupled to the other end of the the second bag, said linking member extending through the cavities of the first and second bags for transmitting force from the other end of the first bag to the other end of the second bag, the cavities having fluid therein at a pressure above atmospheric pressure, the volume of the cavities of the first and second bags being a direct function of the distance between the ends thereof and the fluid pressure within the first and second cavities, whereby the actuator exerts a force on the third bearing block which is a direct function of the pressure difference of the fluid within the first cavity and the second cavity.

4,928,590

NUTCRACKER

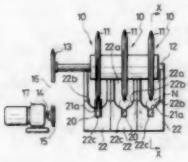
Norio Joyama, and Ikumi Aoki, both of Kawasaki, Japan, assignors to Meiji Seika Kaisha, Ltd., Tokyo, Japan

Filed Nov. 2, 1988, Ser. No. 265,994

Claims priority, application Japan, Nov. 6, 1987, 62-168966[U]

Int. Cl.[5] A23N *5/00*

U.S. Cl. 99—576 **3 Claims**



1. A nutcracker comprising:

at least one rotary disc having indentations on its circumference;

means for rotating said at least one rotary disc;

a stator plate having a curved surface and further indentations formed on said curved surface, said stator plate being positioned with said curved surface in confronting relation with said rotary disc and extending along a predetermined arc of a circumference of said disc, defining a gap that progressively narrows downstream between the curved surface of said stator plate and the disc circumference, said indentations made on the circumference of said rotary disc and further said indentations on the curved surface of said stator plate being formed by teeth which are V-shaped in lateral cross-section;

and a dispensing inclination for dispensing nuts in the shell to the narrowing gap between the curved surface of the stator plate and the disc circumference.

4,928,591

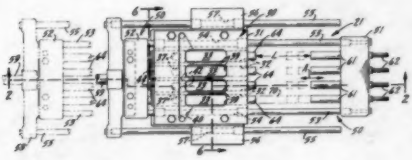
MOLDING MECHANISM FOR ROD-SHAPED FOOD PRODUCT

Scott A. Lindee, New Lenox, Ill., assignor to Formax, Inc., Mokena, Ill.

Filed Aug. 7, 1989, Ser. No. 390,373

Int. Cl.[5] A22C *7/00*

U.S. Cl. 99—485 **27 Claims**



1. A food product molding mechanism for molding rod-shaped food products, comprising:

food pump means for pumping a moldable food material under pressure into one end of a fill passage;

a mold tube assembly mounted in alignment with the other end of the fill passage, the mold tube assembly including a plurality of N elongated mold tubes each of given length, each mold tube aligned parallel to a predetermined mold path and each mold tube having a fill opening aligned with the fill passage;

a mold rod assembly comprising:

a front drawbar;

a rear drawbar;

guide means, interconnecting the drawbars, for maintaining the drawbars in fixed spaced relation to each other adjacent opposite ends of the mold tube assembly, with each drawbar extending across the mold path;

a set of N front mold rods, mounted on the front drawbar, each projecting toward the mold tube assembly parallel to the mold path and in alignment with one of the mold tubes;

a set of N rear mold rods, mounted on the rear drawbar, each projecting toward the mold tube assembly parallel to the mold path and into one of the mold tubes;

the ends of the front and rear mold rods aligned with each mold tube being spaced from each other by a predetermined distance L less than the length of that mold tube; and

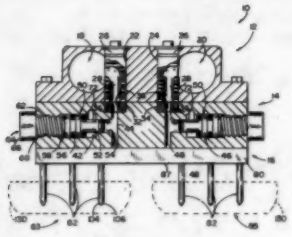
drive means, connected to the mold rod assembly, for cyclically reciprocally driving the mold rod assembly along the mold path between a fill position, in which food material flows from the fill passage into each mold tube between the spaced ends of the mold rods to form a rod-shaped food product of length L in each mold tube, and a discharge position, in which the ends of both sets of mold rods are clear of the front ends of the mold tubes and each rear mold rod fills the interior of its associated mold tube.

4,928,592

DUAL INJECTION CAKE FILLER APPARATUS

Mark Moshier, Manchester, and Ron Politte, Bridgeton, both of Mo., assignors to Continental Baking Company, St. Louis, Mo.

Filed May 15, 1989, Ser. No. 352,005
Int. Cl.[5] A21C *9/00*; A23G *1/20*
U.S. Cl. 99—450.8 **30 Claims**



1. A dual injection cake filler assembly for injecting cakes with semi-fluid substances, said assembly comprising:

a manifold defining a pair of spaced supply channels each having an outlet passage;

valve means on said manifold for controlling flow from said channels to said outlet passages;

a needle plate secured to said manifold, said needle plate defining a pair of inlet recesses, a plurality of needle apertures, a pair of delivery channels with each channel extending from one of said inlet recesses and a plurality of needle inlet portions between said channels and said needle apertures; and

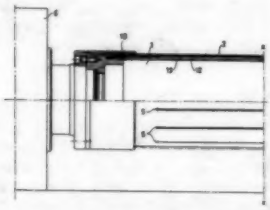
a plurality of split needles each disposed in one of said needle apertures and defining a pair of passages having upper inlets and lower needle outlet ports, said upper inlets each communicating with one of said channels through one of said needle inlet portions, said channels and needle inlet portions being dimensioned so that substantially uniform quantities of semi-fluid material are ejected from said needle discharge ports whereby a single cake may be simultaneously filled with two different fillings.

4,928,593

TENSIONING ROLLER, AND DEVICE PROVIDED WITH SUCH A TENSIONING ROLLER

Siegfried Rückl, Kufstein, Austria, assignor to Schablonentechnik Kufstein GmbH, Austria

Filed Feb. 3, 1989, Ser. No. 306,631
Claims priority, application Netherlands, Feb. 12, 1988, 8800354
Int. Cl.[5] B41F *27/00*
U.S. Cl. 101—389.1 **8 Claims**



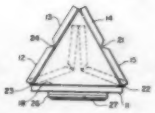
1. Tensioning roller for centred accommodation during the treating of a medium according to a pattern with high-energy radiation, at least comprising a central shaft around which is placed a supporting element for the medium to be treated, which is expandable in the peripheral direction and in the expanded state is arranged symmetrically round the shaft and, measured in the radial direction going out from the shaft comprises a supporting cylinder, an inflatable bag made of elastic material, a thin-walled metal cylindrical sleeve disposed around it, centring means for centring said supporting cylinder, inflatable bag and cylindrical sleeve, and means for the supply and discharge of inflation medium for the inflatable bag, in which the cylindrical sleeve is provided with slots extending essentially in the axial direction and uniformly distributed in the peripheral direction.

4,928,594

FOLDABLE RUBBER STAMP HANDLE

Charles R. Bostick, 833 W. 11th St., San Pedro, Calif. 90731

Filed Apr. 17, 1989, Ser. No. 339,258
Int. Cl.[5] B41K *1/56*
U.S. Cl. 101—405 **4 Claims**



1. A foldable stamp handle comprising:

a central base having opposite ends;

a pair of end sections extending from each end of said base to provide a linear arrangement with said central base established between opposite pairs of said end sections;

an operable fold line defined between adjacent ends of each end section of said pair of end sections and between said central base and each pair of each sections;

a peelable tape backing joining said central base and said opposite pairs of end sections together in end-to-end relationship;

an adhesive layer carried on said central base and pairs of end sections beneath said peelable tape backing adapted to be exposed for securing selected end sections together and other selected end sections to said central base when said end sections are folded about said fold lines whereby said selected end sections provide a handle suitable for finger grasping; and

a rubber-like stamp carried on said central base on its side opposite from its side carrying said handle.

4,928,595

REVERSE SLAPPER DETONATOR

Richard C. Weingart, Livermore, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

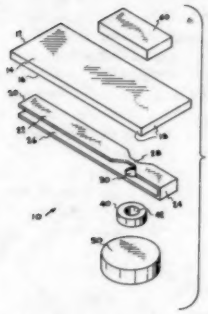
Filed Apr. 27, 1988, Ser. No. 186,527
Int. Cl.[5] F42B *3/12*
U.S. Cl. 102—202.7 **5 Claims**

1. A detonator, that is adapted to be driven by an externally supplied pulse of electric power, the detonator comprising:

a sheetlike insulator, having a first extended and continuous external surface, a second extended and continuous external surface that is parallel to and thinly spaced apart from the first surface, and an edging external surface that adjoins the first surface and the second surface and separates the first surface from the second surface;

a conductor, disposed along a path that proceeds along the first surface, then proceeds to fold around the edging surface, and then proceeds along the second surface, with a portion of the part of the conductor that is disposed along the path proceeding along the first surface comprising a bridge, with an aperture positioned within the part of the conductor that is disposed along the path proceeding along the second surface at a location that is directly across the insulator from the bridge, and with the conductor adapted to receive and transport the pulse of electric power along its path;

a barrel, positioned adjacent to and in alignment with the aperture in the conductor;



an explosive charge, positioned adjacent to and in alignment with the barrel; and

means for buttressing the bridge in the spatial region adjacent to the bridge that is not occupied by the insulator;

whereby, when the pulse of electric power explosively vaporizes the bridge, a portion of the insulator adjacent to the bridge is propelled through the aperture in the conductor, then through the barrel, and then against the explosive charge, thereby detonating the explosive charge.

4,928,596

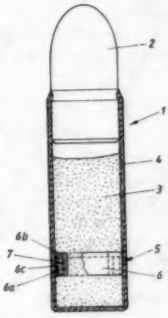
Patent Not Issued For This Number

4,928,597

RING FUZE FOR FIREARM AMMUNITION

Ulrich Zedrosser, Steyr, Austria, assignor to Steyr-Daimler-Puch AG, Vienna, Austria

Filed May 15, 1989, Ser. No. 351,761
Claims priority, application Austria, Jun. 21, 1988, A1601/88
Int. Cl.[5] F42B *5/00*
U.S. Cl. 102—430 **8 Claims**



1. A ring fuze for firearm ammunition, comprising

a hollow fuze ring for mounting in a cartridge case and a primer contained in said fuze ring,

said fuze ring being substantially U-shaped in cross-section and comprising a bottom, an axially extending outer leg positioned adjacent an outer wall of said cartridge case which extends parallel to said outer leg, and an axially extending inner leg,

said inner leg being thicker than said outer leg, said fuze ring being open to the interior of said cartridge case on a side away from said bottom,

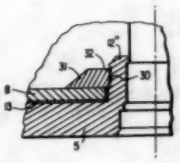
said outer leg igniting said primer when said outer wall is struck laterally by a firing pin.

4,928,598

PROPELLING CHARGE CASE

Udo Sabranski, Willich; Hans W. Luther, Kaarst; Horst Sabinski, Kaarst, and Jürgen Winkelmann, Kaarst, all of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Dusseldorf, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 61,348, Jun. 15, 1987, abandoned. This application Apr. 14, 1989, Ser. No. 338,530
Claims priority, application Fed. Rep. of Germany, Jun. 13, 1986, 3619960
Int. Cl.[5] F42B *5/26*
U.S. Cl. 102—467 **22 Claims**



1. In a propelling charge case for a munition, which charge case has a body which is made of nonwoven nitrocellulose-

based fibers, which is to be fastened to a noncombustible base having an axial collar, and which is formed to have an axial bore in one end of a size corresponding substantially to that of the outer circumference of the collar and a radially inwardly curved portion which extends to an edge surface defining said bore; the improvement wherein said body further comprises a reinforcement member, formed of one of metal and plastic, which is fixedly attached to said body, and which is disposed around said bore and extends from said edge surface toward said curved portion, whereby when said charge case is disposed in the base, the axial collar extends through said bore and a portion adjacent a portion of said body which is reinforced by said reinforcement member.

4,928,599

CONTINUOUSLY ADVANCING TRACK LEVELING, LINING AND TAMPING MACHINE

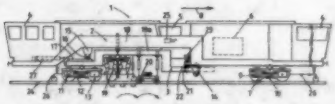
Johann Hansmann, Klosterneuburg, Austria, and Jörg Ganz, Etoy, Switzerland, assignors to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H., Vienna, Austria

Filed Mar. 14, 1989, Ser. No. 323,431

Claims priority, application European Pat. Off., Jul. 26, 1988, 88890196

Int. Cl.[5] E01B *27/17*

U.S. Cl 104—12 **13 Claims**



1. A continuously advancing machine for leveling, lining and tamping a railroad track, which comprises

(a) a main frame extending longitudinally in the direction of the track,

(b) a single undercarriage supporting the main frame on the track and the main frame having a portion projecting in this direction from the single undercarriage,

(c) a drive means connected to the single undercarriage for continuously advancing the main frame in an operating direction,

(d) a brake means connected to the single undercarriage for stopping the advancing main frame,

(e) an operator's cab, an operating control arrangement and a power plant mounted on the continuously advancing main frame,

(f) a tool-carrying frame,

(g) an undercarriage supporting the tool-carrying frame on the track,

(1) the tool-carrying frame supporting undercarriage being spaced from the main frame supporting undercarriage, and

(2) the projecting main frame portion being longitudinally displaceably supported on the tool-carrying frame in said direction,

(h) a drive means for intermittently advancing the tool-carrying frame,

(i) track leveling and lining and tie tamping tool means mounted on the tool-carrying frame within sight of the operator's cab, the tool means including drives for operating the tool means and the drives being actuated by the control arrangement, and

(j) a track leveling and lining reference system connected to the control arrangement for actuating the drives of the track leveling and lining tools in response to the track position detected by the reference system.

4,928,600

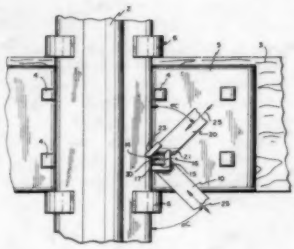
RAILROAD SPIKE HOLDING APPARATUS WITH ACUTE ANGLED JAWS

William T. Urmson, Jr., Bakerstown; Emeric Gaslevic, Glenshaw, and Ronald K. Junk, Sarver, all of Pa., assignors to Harsco Corporation, Wormleysburg, Pa.

Filed Nov. 17, 1988, Ser. No. 272,616

Int. Cl.[5] E01B *29/24*

U.S. Cl. 104—17.1 **20 Claims**



1. Apparatus for holding a railroad spike in a substantially vertical position while said spike is being driven into a railroad tie supporting at least one railroad rail which is being restrained against longitudinal movement by at least one rail anchor attached to said rail in abutting relationship with said tie, said apparatus being supported in a railroad spiking machine, comprising: a support member; a pair of jaws, each jaw pivotally connected to depend from said support member and to pivot in a substantially vertical plane located at an acute angle α to the vertical plane of the rail, said angle α being great enough to avoid interference between said jaws and said anchor when said jaws are pivoted out of contact with said spike and said angle α being small enough to impose sufficient mechanical leverage to firmly hold said spike when said jaws are pivoted into contact with said spike; means to rotate said jaws relative to said support member and relative to each other; the first jaw of said pair of jaws having a cradle formed therein adapted to receive a spike and further adapted to avoid interference with said spike after said spike has been partially driven into a tie and said first jaw is pivoted out of contact with said spike; and the second jaw of said pair of jaws having contact surfaces adapted to contact said spike so as to force it into said cradle and to firmly hold said spike in said cradle.

4,928,601

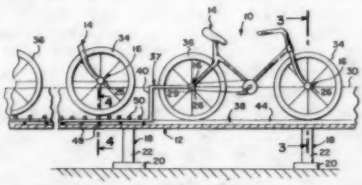
BIKE MONORAIL SYSTEM

Leroy Harder, 232 W. Laurel St., Salinas, Calif. 93906, and George Spector, 233 Broadway #3815, New York City, N.Y. 10007

Filed Jul. 10, 1989, Ser. No. 377,599

Int. Cl.[5] A63G *1/12*

U.S. Cl. 104—53 **1 Claim**



1. A bicycle monorail system which comprises:

(a) a monorail track having an irregular continuous path;

(b) at least two bicycles, each peddled by a rider to run

within said monorail track along said irregular continuous path;

(c) means carried on each of said bicycles for keeping said bicycles centered within said monorail track;

(d) means for preventing said first and second bicycles from bumping into each other on said monorail track;

(e) a plurality of spaced apart support stands, each having a base portion and an upright post so as to elevate the entire monorail track and

(f) a loading platform disposed near said monorail track so that the riders can get on and get off said bicycles; wherein said centering means includes a ball bearing race carried on each opposite distal end of front and rear axles of said bicycles which will bear against top edges and side edges of said monorail track to keep front wheels and rear wheels of said bicycles centered therein; wherein said bumping preventing means includes:

(g) said monorail track having a centered narrow bottom recess which runs parallel therealong;

(h) a pair of elongated Z-shaped drag bars each extending from rear axle on one of said bicycles and goes within said bottom recess;

(i) ball bearings carried within opposite side walls of said bottom recess to guide said drag bars;

(j) a first set of rollers carried on bottom surface of each of said drag bars to ride within said bottom recess of said monorail track and

(k) a second set of rollers carried on top surface of each of said drag bars so that if said bicycles gets close to each other the front and rear wheels of one of said bicycles will ride upon said second set of rollers instead of bottom of said monorail track to prevent said bicycles from bumping against each other.

4,928,602

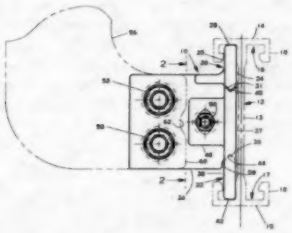
TRACK CLAMP ASSEMBLY

Edward Duczkowski, Jr., South Lyon, and Clayton C. McDonald, Howell, both of Mich., assignors to Jervis B. Webb Company, Farmington Hills, Mich.

Filed Mar. 6, 1989, Ser. No. 319,544

Int. Cl.[5] **E01B** *25/22, 9/38;* **B25G** *3/20*

U.S. Cl. 104—111 **16 Claims**



1. A track clamp assembly engageable with a track having an I-shaped cross-sectional configuration formed by a vertical web with parallel horizontal flanges extending perpendicular thereto and having a pair of longitudinally extending oppositely facing grooves provided in the flanges on at least one side of the web adjacent to the junctions between the web and the flanges, said track clamp assembly comprising:

an upper clamp member having parallel ends spaced apart a desired distance longitudinally of said track, one end being longer than the other end, an upper edge extending between the upper extremities of said ends, and upper ramp surface means disposed between the lower extremities of said ends, said upper ramp surface means facing oppositely from said upper edge and extending obliquely relative thereto, said upper edge being insertable in the upper groove of the pair of grooves on said one side of the vertical web of the track;

a lower clamp member, said lower clamp member having shorter and longer ends arranged oppositely to said upper member ends, a lower edge extending between the lower extremities of of said shorter and longer ends, and lower ramp surface means disposed between the upper extremities of said shorter and longer ends, said lower ramp surface means facing oppositely from and extending obliquely to said lower edge in complementary relation to said upper ramp surface means, said lower edge being insertable in the lower groove of said pair of grooves on said one side of the vertical web of the track; and

means for forcing said upper and lower edges into clamped engagement with the track comprising connecting means securing said upper and lower clamp members to each other with their said upper and lower edges respectively inserted in the upper and lower grooves of said pair of grooves, and with their said upper and lower ramp surface means in interengagement, said connecting means being operable to relatively move said clamp members together along said upper and lower ramp surface means, the width dimension of said track clamp assembly between said upper and lower edges being increasable in response to such relative movement.

4,928,603

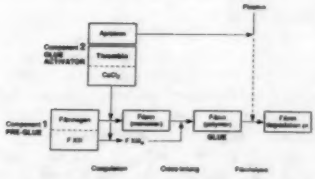
METHOD OF PREPARING A CRYOPRECIPITATED SUSPENSION AND USE THEREOF

Eric Rose, Palisades, N.Y., and Arthur Dresdale, Plainfield, N.J., assignors to The Trustees of Columbia University in the City of New York, New York, N.Y.

Continuation of Ser. No. 893,338, Aug. 5, 1986, abandoned, which is a division of Ser. No. 688,601, Jan. 13, 1985, Pat. No. 4,627,879, which is a continuation-in-part of Ser. No. 648,752, Sep. 9, 1984, abandoned. This application Jun. 6, 1988, Ser. No. 203,006

Int. Cl.[5] **A61B** *17/04;* **A61K** *37/00;* **C08L** *89/00*

U.S. Cl. 106—124 **8 Claims**



1. A method of preparing a cryoprecipitated suspension containing fibrinogen and Factor XIII useful as a precursor in the preparation of a fibrin glue which consists essentially of:

(a) freezing fresh frozen plasma from a single donor which has been screened for blood transmitted diseases at about −80° C. for at least 6 hours,

(b) raising the temperature of the frozen plasma so as to form a supernatant and a cryoprecipitated suspension containing fibrinogen and Factor XIII, and

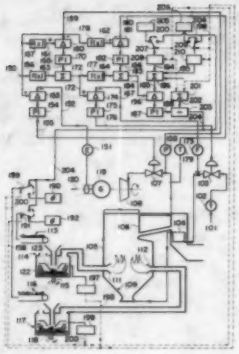
(c) recovering the cryoprecipitated suspension.

4,928,604

CONTROL SYSTEM FOR PULVERIZED COAL FIRED BOILER

Yukio Fukayama, and Taku Oshima, both of Kure, Japan, assignors to Babcock-Hitachi Kabushiki Kaisha, Tokyo, Japan

Filed May 30, 1989, Ser. No. 358,412
Claims priority, application Japan, May 31, 1988, 63-131342
Int. Cl.[5] F23K *3/00*; F22B *37/42*
U.S. Cl. 110—103 1 Claim



1. A control system for a pulverized coal first boiler provided with a pulverized coal producing equipment including a coal feeding section, a milling section and a classifying section and an adjuster for adjusting a coaling rate thereof, and a pulverized coal burning equipment for burning the pulverized coal supplied from said pulverized coal producing equipment, said control system comprising:

first calculating means reading in a flow rate and a grain size distribution of coal supplied from said coal feeding section, and a flow rate and a grain size distribution of coal supplied from said classifying section and calculating and outputting a flow rate and a grain size distribution of coal at an inlet of said milling section on the basis of said read flow rates and said read distributions;

second calculating means reading in said flow rate and said grain size distribution of the coal at said inlet of said milling section from said first calculating means and calculating and outputting a low rate and a grain size distribution of coal at an outlet of said milling section;

third calculating means reading in said flow rate and said grain size distribution of the coal at said outlet of said milling section from said second calculating means and calculating and outputting a flow rate and a grain size distribution of coal to be returned from an outlet of said classifying section to said milling section and a coaling rate at which coal is to be supplied to said pulverized coal burning equipment; and

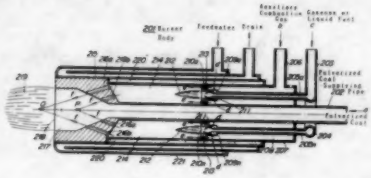
means for operating said adjuster to adjust a coaling rate at which coal is supplied from said pulverized coal producing equipment to said pulverized coal burning equipment on the basis of said coaling rate from said third calculating means.

4,928,605

OXYGEN HEATER, HOT OXYGEN LANCE HAVING AN OXYGEN HEATER AND PULVERIZED SOLID FUEL BURNER

Toshio Suwa, Kawasaki; Nobuaki Kobayashi, and Takashi Hirano, both of Tokyo, all of Japan, assignors to Nippon Sanso Kabushiki Kaisha, Tokyo, Japan

PCT No. PCT/JP86/00582, § 371 Date Jul. 9, 1987, § 102(e) Date Jul. 9, 1987, PCT Pub. No. WO87/03065, PCT Pub. Date May 21, 1987
PCT Filed Nov. 14, 1986, Ser. No. 86,734
Claims priority, application Japan, Nov. 15, 1985, 60-256351; Nov. 15, 1985, 60-256352; Nov. 15, 1985, 60-256353
Int. Cl.[5] F23C *1/10*; F23D *1/00*
U.S. Cl. 110—261 12 Claims



1. A hot oxygen lance comprising an outer cylinder, oxygen supply means for supplying oxygen to the inside of the outer cylinder, and

an oxygen heater and a center pipe, both disposed within the outer cylinder, the center pipe serving as a pipe for supplying a pulverized material to the outer cylinder, the oxygen heater

defining a plurality of combustion chambers communicating with the oxygen supply means and circumferencially disposed around the center pipe, for both mixing and burning fuel with oxygen supplied thereto, each of the combustion chambers having an opening for blowing a flame, the oxygen heater including:

fuel supply means for supplying fuel to said plurality of combustion chambers; and

oxygen nozzles, surrounding the opening of each of said combustion chambers and communicating with the oxygen supply means, for allowing oxygen supplied thereto to flow out therefrom and to form oxygen curtains, each of the curtains surrounding a flame due to the combustion in the corresponding combustion chamber to protect both the outer cylinder and the center pipe from heat emitted by the flame.

4,928,606

COMBUSTION OF LOW B.T.U./HIGH MOISTURE CONTENT FUELS

Walter T. Mullen, Burlington, Canada, assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Jan. 13, 1988, Ser. No. 143,902
Int. Cl.[5] F23D *1/00*
U.S. Cl. 110—347 1 Claim

1. In a method for controlling combustion in a furnace producing steam and having a bed of burning fuel said method comprising:

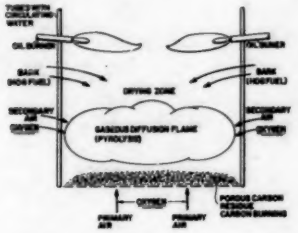
measuring the long term brightness of said bed of burning fuel;

measuring the short term brightness of said bed of burning fuel; and

determining the difference between said long-term brightness and said short term brightness;

the improvement comprising admitting oxygen under or at the bed in the primary air and/or above the bed for stabi-

lizing the combustion rate of the fuel or increasing the combustion rate of the fuel,



and controlling the amount of oxygen admitted into said furnace based on said difference.

4,928,607

ELECTRONICALLY CONTROLLED PNEUMATIC SEEDER

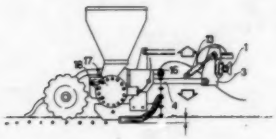
Luigi Gaspardo, Morsano Al Tagliamento, Italy, assignor to Gaspardo S.p.A., Italy

Filed Mar. 7, 1989, Ser. No. 320,169

Claims priority, application Italy, Mar. 16, 1988, 19792 A/88

Int. Cl.[5] A01C *7/04*; B23Q *7/02*; G07F *11/00*

U.S. Cl. 111—185 **3 Claims**



1. A pneumatic seeder, comprising:

a support;

a seeding unit connected to said support;

a revolving disc distributor mounted for rotation to said seeding unit and having a plurality of holes for engaging a plurality of seeds, the holes being movable in a trajectory with rotation of said distributor;

a distributor motor connected to said distributor for rotating said distributor;

a wheel rotatably mounted about an axis to said support, said wheel being adapted for contacting the ground for rotation of said wheel with movement of the support over the ground;

a speed transducer operatively connected to said wheel for transmitting a series of impulses which are indicative of speed of the support over the ground;

a blade connected to said seeding unit and movable toward and away from the trajectory of the holes of the distributor, for contacting seeds engaged with the holes of the distributor;

a blade motor connected to said blade for moving said blade;

a photocell located in the proximity of the trajectory of the holes for sensing the presence of seeds engaged with the holes;

first electronic control means connected between said speed transducer and said distributor motor for receiving the series of impulses and for controlling the speed of the distributor motor as a function of the speed of the support over the ground; and

second electronic control means connected between said photocell and said blade motor for controlling the movement of said blade as a function of signals from said photocell, to move said blade motor to a greater or lesser extent into engagement with the trajectory of the holes of said distributor.

4,928,608

APPARATUS FOR JOINING THE POCKET TRIMMING AND THE POCKET BAG IN TROUSER POCKETS

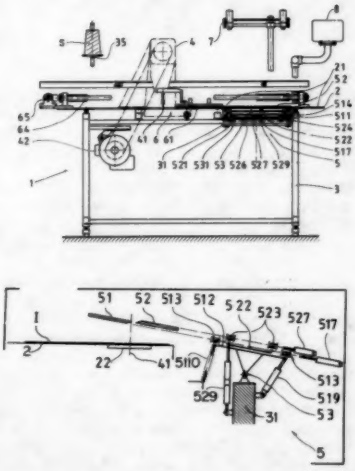
Helmut Schips, Klosterweidlistrasse 1, CH-9010 St. Gallen, Switzerland

Filed Mar. 20, 1987, Ser. No. 28,568

Claims priority, application Switzerland, Mar. 24, 1986, 01171/86

Int. Cl.[5] D05B *21/00*

U.S. Cl. 112—121.12 **12 Claims**



1. An apparatus for joining a pocket bag to a pocket trimming at a folded fabric edge of the pocket trimming comprising means for sewing said pocket bag with said pocket trimming, means for folding said pocket trimming prior to sewing, and means for conveying said pocket bag and said pocket trimming to said means for sewing after folding of said pocket trimming, said means for folding comprising a folding plate and a holding-down plate, each of which is power operable and arranged to be pivotable up and down relative to a table plate and linearly displaceable in a direction transverse to a longitudinal extension of the table plate, said folding plate and said holding-down plate being movable independently of each other, said folding plate including a pressure cylinder for pivoting said folding plate upwardly from a horizontal position into an inclined position relative to said table plate, and a tension spring for pivoting said folding plate downwardly into a horizontal position relative to said table plate, said holding-down plate including a pressure cylinder for pivoting said holding-down plate both upwardly from a horizontal position into an inclined position relative to said table plate and downwardly into a horizontal position relative to said table plate, said folding plate and said holding-down plate each having a pressure cylinder for linearly disposing said folding plate and said holding-down plate relative to said table plate.

4,928,609

AUTOMATIC SEWING APPARATUS

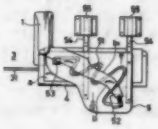
Kiyoshi Kawasaki, Akishima, Japan, assignor to Tachi-S Company, Ltd., Tokyo, Japan

Filed Mar. 20, 1989, Ser. No. 325,410

Claims priority, application Japan, Aug. 9, 1988, 63-198698

Int. Cl.[5] D05B *21/00*

U.S. Cl. 112—121.12 **13 Claims**



1. An automatic sewing apparatus, which is adapted for sewing a curved edge of a first blank material with an edge of a second blank material, comprising:

a sewing means;

a table of said sewing means;

a lower guide plate which is movably mounted on said table, upon which lower guide plate, secured is said second blank material;

an upper guide plate which is fixedly supported in such as manner as to be disposed above said lower guide plate, upon which upper guide plate, secured is said first blank material; and

said upper guide plate being formed with a guide groove and having a movable guide piece movable along said guide groove, said movable guide piece being adapted to secure thereon a rearward end of said first blank material and further having a slidable means which is slidably fitted in said guide groove, wherein said guide groove is formed in a shape conforming to a track which is to be shown by said slidable means in order to orient said curved edge of said first blank material in a tangentially identical direction to a sewing path of said sewing means.

4,928,610

SEWING MACHINE PNEUMATIC DECURLER

Hiromi Akutsu, Shioya, Japan, assignor to Juki Corporation, Tokyo, Japan

Filed Oct. 31, 1988, Ser. No. 265,044

Claims priority, application Japan, Oct. 31, 1987, 62-167259[U]

Int. Cl.[5] D05B *35/00*

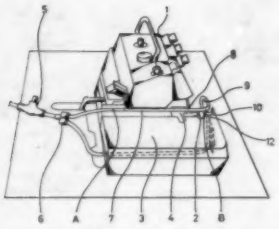
U.S. Cl. 112—153 **9 Claims**

1. An apparatus for eliminating curls at the edge of a first fabric workpiece before sewing the first fabric workpiece to a second fabric workpiece along the curled edge on a sewing device having a vertically movable presser foot and a throat plate, the curl eliminating apparatus comprising:

means for generating air flow;

a first tube having a first end portion connected to said means for generating air flow and a second end portion fixed on the presser foot, said second end portion including an opening facing said curls and a contact portion extending horizontally and overlapping said curled edge of said first fabric workpiece for contacting with said curled edge when said presser foot moves downwardly;

a second tube having a first end connected to said means for generating air flow and a second end situated under the throat plate and including an opening facing said curls, and



a valve positioned between said means for generating air flow and first and second tubes for controlling air flow.

4,928,611

SEWING MACHINE WITH GUIDE AND IRONING MEANS FOR FOLDING BACK AND PRESSING STITCHED FABRIC MARGINS

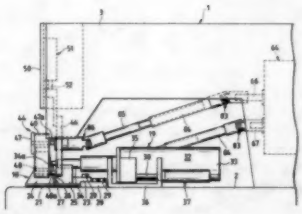
Yoshitake Ogawa, Kasugai, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

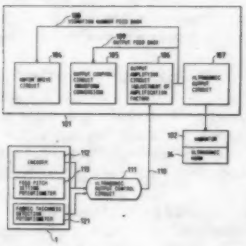
Filed Nov. 8, 1989, Ser. No. 433,225

Claims priority, application Japan, Nov. 15, 1988, 63-288497; Nov. 15, 1988, 63-288498

Int. Cl.[5] D05B *35/02*

U.S. Cl. 112—217 **7 Claims**





1. In a sewing machine including:

stitching means for stitching upper and lower fabric pieces;

feed means for feeding the upper and lower fabric pieces which are stitched together;

a guide means for folding back, away from each other, stitched margins of the upper and lower fabric pieces fed by the feed means, the guide means being disposed downstream of a point where the upper and lower fabric pieces are stitched by the stitching means with respect to the

direction in which the upper and lower fabric pieces are fed by the feed means; and

ultrasonic heating means for ironing the stitched margins of the fabric pieces which have been folded back by the guide means, the improvement comprising:

fabric thickness detecting means for detecting the thickness of the upper and lower fabric pieces upstream of a point where the upper and lower fabric pieces are heated by the ultrasonic heating means, and for producing a thickness signal representing the detected thickness;

determining means for producing a determining signal when a region of the upper and lower fabric pieces which has been detected by the fabric thickness detecting means is fed by the feed means and reaches the point where the upper and lower fabric pieces are heated by the ultrasonic heating means; and

control means responsive to the determining signal for producing a control signal to iron and heat the upper and lower fabric pieces depending on the thickness thereof based on the thickness signal from the fabric thickness detecting means and for applying the control signal to the ultrasonic heating means.

4,928,612

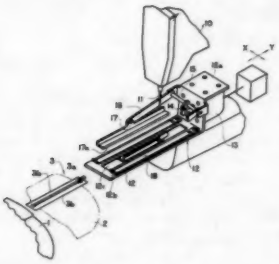
AUTOMATIC SEWING MACHINE EXCLUSIVELY USED FOR SEWING ZIPPER ON WORKPIECE

Tohru Hiramatsu; Kazuya Tami, and Torao Ohchi, all of Tokyo, Japan, assignors to Tokyo Juki Industrial Co., Ltd., Tokyo, Japan

Division of Ser. No. 882,884, Jun. 24, 1986, Pat. No. 4,854,251. This application May 2, 1989, Ser. No. 346,122

Int. Cl.[5] D05B *75/00, 29/00*

U.S. Cl. 112—257 **4 Claims**



1. A zipper setting device adapted to be detachably attached to a drive device biaxially movable in a plane vertical to the movement direction of the needle of a sewing machine comprising:

a platform having an attachment portion detachably secured to said drive device and an opening through which said needle passes;

a zipper holding-down member provided on said platform adjacent to said opening in the platform for detachably holding said zipper on the platform in alignment with a predetermined position on the platform; and

a workpiece holding-down mechanism provided on said mount for detachably holding said workpiece on the platform in a predetermined position with respect to said zipper.

4,928,613

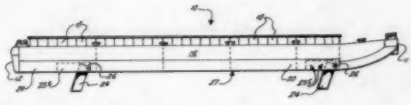
RETRACTABLE STEERING DEVICE FOR CARGO BARGES THAT INCREASES MANEUVERABILITY BY PROVIDING A PIVOT POINT OR POINTS WHEN ALTERING COURSE

William B. Rudolf, 10001 Point Aux Chenes Rd., Ocean Springs, Miss. 39564

Filed Nov. 9, 1988, Ser. No. 269,242

Int. Cl.[5] B63H *25/00*

U.S. Cl. 114—26 **14 Claims**



1. A retractable steering device for maneuvering liquid/bulk cargo carrying barges that can be lashed together to form a tow, comprising:

(a) a rectangular barge hull having a generally flat bottom defining a lowermost horizontal base plane surface and an upper deck, and generally vertical port and starboard sidewalls;

(b) a cargo hold contained at the central portion of and extending over a substantial portion of the barge hull area for containing a bulk or liquid cargo;

(c) port and starboard wing tanks positioned respectively between the port and starboard sidewalls of the hull and the cargo hold;

(d) a pair of longitudinally extending slots positioned adjacent the respective port and starboard wing tanks and defining an opening that communicates at least with the barge bottom to provide an opening to the sea under the barge horizontal base plane surface at the respective wing tanks; and

(e) a pair of steering members adapted to move within the respective slots and each being movable between an extended position wherein the steering member extends downwardly well below the barge hull bottom horizontal base plane surface when the barge hull floats high such as when empty to increase tow maneuverability by creating a steering pivot point when the barge is being pushed, and a retracted position wherein the steering member is protectively contained within the slot.

4,928,614

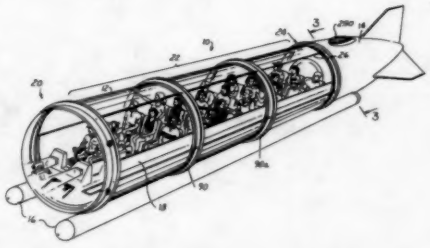
SUBMERSIBLE OBSERVATION VESSEL

Willis R. Forman, San Diego, Calif., assignor to Ronald Nilson and Sea View Enterprises, both of St. Clair Shores, Mich., a part interest

Filed Apr. 12, 1989, Ser. No. 337,179

Int. Cl.[5] B63B *35/72*

U.S. Cl. 114—66 **21 Claims**

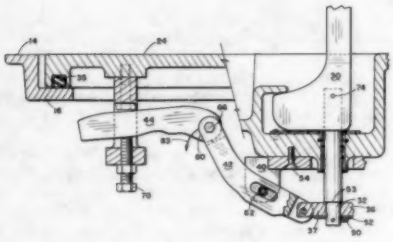


1. A hull comprising:

(a) first and second encircling end sealing means;

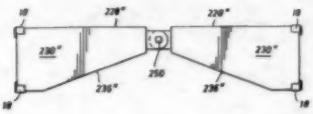
(b) a hatch mounted on and closing one side of said first end sealing means;
(c) a bulkhead mounted on one side of and closing said second end sealing means;
(d) at least one intermediary encircling sealing means; and
(e) a plurality of transparent cylinders with peripheral ends interposed between said intermediary sealing means and said first and second end sealing means.

4,928,615
HATCH COVER
John E. Williams, 5727 Nakat Way, Blaine, Wash. 98230
Filed Mar. 27, 1989, Ser. No. 328,620
Int. Cl.[5] E05D *15/54*
U.S. Cl. 114—203 **5 Claims**



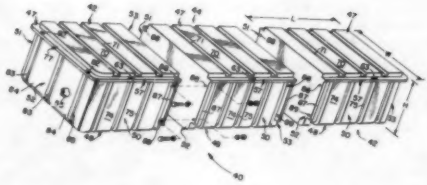
1. A cover for a hatch which cover will engage with a rim to produce a water tight seal, which comprises:
a. a plate capable of seating in said rim:
b. a shaft extending vertically through an aperture in said plate and slidably received the rein:
c. handle means on one size of said plate, one end of said handle means pivotally connected to said shaft to move said handle from a closed position parallel to said plate to an open position substantially perpendicular to said plate where by said handle means may impart vertical movement to said shaft with respect to said plate; and
d. a plurality of arm assemblies extending radially outward from said shaft on the size of said plate opposite said handle, whereby movement of said handle vertically moves said shaft which imparts movement to said arm assemblies, thereby extending or retracting said arm assemblies to engage with or disengage from said rim.

4,928,616
CONSTRUCTION TRANSPORATION SYSTEM
Alces P. Robishaw, and Paul A. Robishaw, both of Houston, Tex., assignors to Robishaw Engineering, Inc., Houston, Tex.
Division of Ser. No. 70,348, Jul. 7, 1987, Pat. No. 4,811,681, which is a continuation of Ser. No. 757,631, Jul. 22, 1985, abandoned, which is a continuation-in-part of Ser. No. 642,181, Aug. 17, 1984, Pat. No. 4,610,215. This application Mar. 14, 1989, Ser. No. 323,344
Int. Cl.[5] B60P *7/13*
U.S. Cl. 114—267 **4 Claims**



1. A transportation and construction method comprising the steps of:
connecting together at least two construction components to form a transport assembly having gross dimensions generally corresponding to those of an ISO standard freight container, said two components being rake components each having a bottom which is graduated, whereby the rake component has a deep end and a shallow end, the two rake components being connected in said transport assembly with their shallow ends adjacent to and facing each other and their deep ends forming respective outer ends of the assembly;
transporting the assembly to a construction site in the manner of an ISO standard freight container;
disconnecting the components of the assembly; and
reassembling said components with other components in a configuration different from the transport assembly, to form a structure.

4,928,617
MODULAR FLOAT DRUM SYSTEM
Jon D. Meriwether, Follansbee, W. Va., assignor to The Louis Berkman Company, Steubenville, Ohio
Continuation of Ser. No. 280,214, Dec. 5, 1988, abandoned, which is a continuation of Ser. No. 84,159, Aug. 12, 1987, Pat. No. 4,799,445. This application Nov. 22, 1989, Ser. No. 440,444
Int. Cl.[5] B63B *35/00*
U.S. Cl. 114—267 **7 Claims**



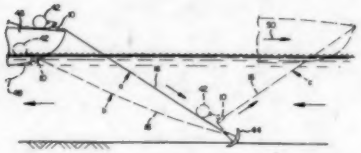
1. A modular float drum assembly for use in supporting a floating structure comprising:
at least two one-piece, plastic molded float drum modules, each drum module having a top wall, a bottom wall and contiguous first, second, third and fourth side walls extending between said top and bottom walls to define a buoyant enclosure contained therein;
rigidizing means integrally formed in each module to rigidize each module against deformation, said rigidizing means including a generally flat first wall segment contiguous with said top wall, a generally flat second wall segment spaced a distance away from said first wall segment and contiguous with one of said side walls, and an end wall segment interconnecting said first wall segment with said second wall segment, said first and second wall segments having essentially identical openings formed therein and aligned with one another, and an interconnecting wall segment extending about at least a portion of the peripheral edge of said openings and also interconnecting said first and second wall segments whereby a double wall construction rigidizes said module when fasteners securing said module to said floating structure are applied through said openings; and
module securing means formed in one of the side walls of each module for releasably joining one module to another module in an aligned relationship where the modules are in side-by-side physical contact with one another.

4,928,618

CONNECTOR FOR ATTACHING A FLOAT TO A SMALL BOAT ANCHOR LINE

Walter R. Kubli, 5040 S.W. Texas St., Portland, Oreg. 97219

Filed Mar. 3, 1989, Ser. No. 318,545
Int. Cl.[5] B63B *21/22*
U.S. Cl. 114—293 **2 Claims**



1. A connector for attaching a float to an anchor line, comprising:

a tubular member having open ends,

said tubular member including a pair of cooperating sections hingedly connected together longitudinally thereof and arranged to be opened to allow the anchor line to be inserted or removed laterally from the side,

releasable fastening means on said tubular member arranged to connect said sections together to confine the anchor line therein or to allow insertion or removal of the anchor line,

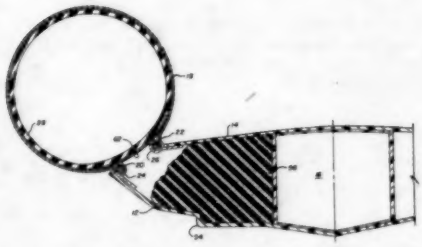
and a lever pivotally mounted on said tubular member having a projecting end connected directly to a float and an inner blade end engageable with the anchor line for providing unidirectional movement of the anchor line under the influence of the float.

4,928,619

MODULAR RIGID INFLATABLE AQUATIC VESSEL STRUCTURE

William H. Cochran, P.O. Box 252, Exeter, R.I. 02822

Filed Nov. 29, 1988, Ser. No. 277,381
Int. Cl.[5] B63B *7/00*
U.S. Cl. 114—345 **41 Claims**



1. A boat having a hull and comprising:

a hull portion disposed generally at and below the water level of the hull;

a flexible hull portion, said flexible hull portion including a flexible shroud element and at least one buoyant element, said flexible hull portion being disposed generally at and above the water level of the hull;

first connecting means for connecting said shroud element to said hull portion along at least a longitudinal side edge of said shroud element;

a deck part extending longitudinally at least a substantial portion of the length of the hull portion and transversely at least a substantial portion of the width of the hull portion;

a box girder means provided along the longitudinal axis of the boat and mounted between said deck part and said hull portion, said box girder means having first and second longitudinally extending sidewalls, said sidewalls being laterally spaced from said at least one buoyant element; and

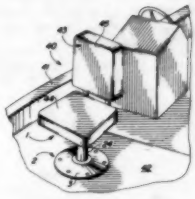
second connecting means for connecting said shroud element to said deck part along at least a longitudinal side edge of said shroud element so that said shroud element surrounds said at least one buoyant element and mounts the same to said deck part and said hull portion.

4,928,620

SEAT PEDESTAL MOUNT

Lesley B. Currey, 122 Park St., Monticello, Ark. 71655

Filed Sep. 1, 1988, Ser. No. 239,407
Int. Cl.[5] B63B *29/00*
U.S. Cl. 114—363 **13 Claims**



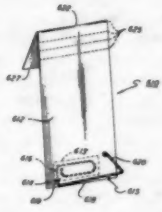
1. A seat pedestal mount for removably mounting a seat having a seat pedestal on a stable surface, comprising a base plate having a plate flange adapted for mounting on the stable surface; a bushing seat carried by said plate flange, said bushing seat adapted for recessing in the stable surface; a seat slot provided in said bushing seat and a nut provided in said seat slot; a seat shoulder located above said seat slot and a lock washer located on said seat shoulder; a threaded nipple projecting from the seat pedestal for threadably engaging said lock washer and said nut; and bushing means inserted in said bushing seat, whereby the seat pedestal is inserted in said bushing means and the seat is securely mounted above the stable surface.

4,928,621

BOOKMARKER

Scott A. Capamaggio, 6377 Mill Pond Road, Byron, N.Y. 14422

Continuation-in-part of Ser. No. 184,369, Apr. 21, 1988, Pat. No. 4,813,370. This application Dec. 21, 1988, Ser. No. 287,118
Int. Cl.[5] B42D *9/02*
U.S. Cl. 116—234 **8 Claims**



7. A bookmarker for use with a book comprising:

a removable rigid support structure having a first end and a second end, said rigid support structure being substantially flat and designed for placement between pages of a book, said second end of said rigid structure extends below the edge of the page, said second end being capable

of being folded to help source said bookmarker within said book;

a retaining spring for marking a place in said book, said retaining spring being secured to said first end of said rigid support structure and comprising generally a horizontal section and a generally vertical section which extends into said book for placement against the pages of the book.

4,928,622

MACHINE FOR APPLYING ADHESIVE TO AN ELONGATE SHEET MATERIAL

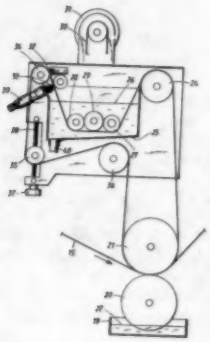
Lennart Larsson, Malmö, and Arne Andersson, Dalby, both of Sweden, assignors to AB Akerlund & Rausing, Sweden

Filed Jan. 27, 1989, Ser. No. 303,750

Claims priority, application Sweden, Feb. 12, 1988, 8800470

Int. Cl.[5] B05C *1/12*

U.S. Cl. 118—70 **3 Claims**



1. A machine for applying adhesive on one side of an elongate sheet material comprising:

an adhesive application roller having a width along a rotational axis,

a driven pressure roller having a width along a rotational axis, said pressure roller disposed adjacent said application roller so that a nip is formed between said pressure roller and said application roller,

means for passing the sheet material through said nip, said width of each of said application roller and said pressure roller surpassing the width of the sheet material,

an adhesive containing trough disposed in spaced relation to said application roller so that said application roller extends into said adhesive containing trough,

an endless belt arranged for rotation around said pressure roller, said endless belt having an outer surface acting as the contact surface of said pressure roller upon the sheet material,

second trough means containing a rinsing fluid,

at least one guide roller means guiding said endless belt through said second trough to rinse a section of said belt,

brush roller means mounted in said second trough adjacent said outer surface of said endless belt, said brush roller means being driven in counter rotation to said direction of rotation of said endless belt, and

further guiding means to guide said rinsed section of said endless belt back to said pressure roller.

4,928,623

VARNISH COATING MECHANISM

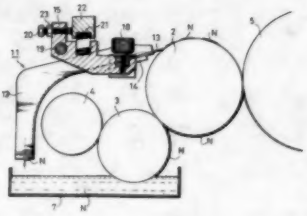
Yasutaka Kojima, Tokyo, Japan, assignor to Akiyama Printing Machine Manufacturing Company, Ltd., Tokyo, Japan

Filed Sep. 13, 1988, Ser. No. 243,806

Claims priority, application Japan, Apr. 26, 1988, 63-103488

Int. Cl.[5] B05C *1/02*

U.S. Cl. 118—249 **4 Claims**



1. In an offset printer comprising a frame, a storage vessel, an applicator roller transferring varnish from the storage vessel to a blanket drum, the blanket drum transferring said varnish to a printed surface, the improvement comprising apparatus for scraping varnish from the applicator roller after the applicator roller has transferred varnish from the storge vessel to the blanket drum, said apparatus comprising a scraping blade, a support to which said scraping blade is mounted and means for mounting said support to the frame of said printer to resiliently bias said scraping blade in contact with said applicator roller for removing any remaining varnish from the applicator roller after transferring varnish to said blanket drum, said support comprising a vessel guiding the removed varnish from the applicator roller to said storage vessel whereby the scraped varnish is recycled.

4,928,624

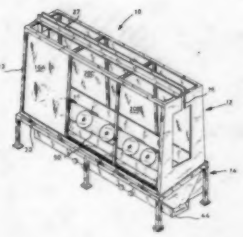
POWDER SPRAY BOOTH WITH OVERSPRAY COLLECTION SYSTEM

Duncan E. Overton, Jr., 1016 Oglewood Ave., Knoxville, Tenn. 37917

Continuation-in-part of Ser. No. 12,798, Feb. 9, 1987, abandoned. This application Sep. 2, 1988, Ser. No. 240,075

Int. Cl.[5] B05B *15/12*

U.S. Cl. 118—308 **4 Claims**



1. A powder spray booth for spray coating articles with powder using a spray gun, said powder spray booth being connectable to an external blower means, said spray booth comprising:

a spray chamber defined by a pair of oppositely disposed end walls and front and rear walls thereby defining an interior volume wherein said articles are sprayed, said spray chamber defining a first opening in said front wall for receiving said spray gun therethrough and a further open-

ing in a selected one of said front wall and said rear wall for accessing said interior volume for cleaning, said spray chamber having an open bottom portion;

closure means for selectively closing said further opening, said closure means including top and bottom frame members provided with cooperating channels and removable panel members disposed in said channels, said panel members being inserted into said channels by a lift-up/slide-in motion and being removed from said channels by a lift-up/slide-out motion;

a base portion secured to said open bottom portion of said spray chamber, said base portion including an oversprayed powder collection section disposed beneath said spray chamber, said oversprayed powder collection section having at least two oppositely disposed downwardly converging sidewalls, a clean air plenum section having a common wall with said oversprayed powder collection section, and means for supporting said booth above a floor, said oversprayed powder collection section having an open top portion which cooperates with said open bottom portion of said spray chamber whereby heavier particles of oversprayed powder fall by gravity into said oversprayed powder collection section and whereby said oversprayed powder collection section is accessible through said further opening in said spray chamber;

cantilevered support means attached to said common wall between said clean air plenum section and said oversprayed powder collection section;

filter means supported on said support means and in fluid communication with said clean air plenum section, said filter means comprising at least one canister-type filter element provided with an axial passageway, said filter means accessible from said further opening of said spray chamber;

fastening means for releasably securing said filter means to said common wall between said oversprayed powder collection section and said clean air plenum section

an exhaust port means for connection to said external blower means, said exhaust port means being positioned in an exterior wall panel of said clean air plenum section whereby air is drawn from said spray chamber through said filter means into said clean air plenum section through an opening in said common wall and exhausted exterior to said booth by said blower means, thereby causing lighter oversprayed powder particles entrained in said air to be collected on an exterior surface of said filter means; and

container means releasably secured to said base portion proximate an opening defined by a bottom portion of said oversprayed powder collection section whereby heavier particles of oversprayed powder fall by gravity into said container means.

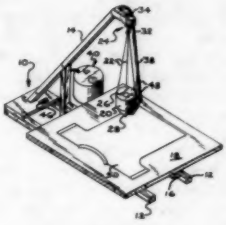
4,928,625

PENDULUM MOUNTED AIRBRUSH

William A. Woods, Redford, Mich., assignor to Spirotron Corporation, Detroit, Mich.

Filed Sep. 25, 1989, Ser. No. 412,189
Int. Cl.[5] B05B *13/04*; B05C *5/00*
U.S. Cl. 118—323 **11 Claims**

1. An apparatus for painting unique abstract designs on substrate utilizing pendulum motion, comprising, in combination, a frame member, a pendulum mass, support means suspending said mass from said frame member permitting said mass to swing freely in any direction under the influence of gravity, a substrate support located below said pendulum mass, a reservoir capable of containing one or more colors of a pigment containing medium, and medium applying means defined on said pendulum mass in communication with said



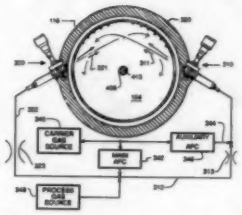
reservoir capable of applying said one or more colors of said medium to the associated substrate as said mass is swinging.

4,928,626

REACTANT GAS INJECTION FOR IC PROCESSING

David K. Carlson, Santa Clara, and Paul R. Lindstrom, Aptos, both of Calif., assignors to Applied Materials, Inc., Santa Clara, Calif.

Filed May 19, 1989, Ser. No. 353,929
Int. Cl.[5] C23C *16/00*
U.S. Cl. 118—715 **10 Claims**



1. In a thermal reactor for semiconductor processing, a gas injection system comprising:

a reaction chamber, said chamber having a chamber axis of symmetry generally parallel to which semiconductor wafers are arranged so that reactant gas flowing generally parallel to said chamber axis can interact with major surfaces of said wafers, said chamber including a shroud means for diverting injected gas, said shroud means including an injection origin defining an injection plane therethrough perpendicular to said chamber axis and an injection line therethrough parallel to said chamber axis;

a first nozzle for injecting a first gas jet into said chamber along a first path toward said shroud;

a second nozzle for injecting a second gas jet into said chamber along a second path toward said shroud;

nozzle control means for controlling said first and second nozzles so that said first and second gas jets flow at least partially against each other and against said shroud to promote a combined gas flow generally parallel to said chamber axis, said nozzle control means providing for direction control of each of said first and second nozzles so that the direction of each gas jet can be changed azimuthally relative to said injection line and in elevation relative to said injection plane to control said combined gas flow; and

gas source means for providing reactant gas flow to said first and second nozzles for introduction into said chamber;

a coarse flow controller for providing a relatively coarsely regulated gas flow from said gas source, said first coarse

flow controller having a coarse control input for controlling the rate of gas flow therethrough;

a first conduit for conveying gas provided by said coarse flow controller to said first nozzle

a second conduit for conveying gas provided by said coarse flow controller to said second nozzle, said first and second conduits being designed so that more of the gas flow provided by said coarse flow controller is directed through said first nozzle than through said second nozzle;

a third conduit for conveying gas from said gas source to said first nozzle; and

a fine flow controller for providing a relatively finely regulated gas flow from said gas source through said third conduit, said fine flow controller having a fine control input for controlling the rate of gas flow through said third conduit so that the gas flows through said first and second nozzles can be precisely balanced.

4,928,627

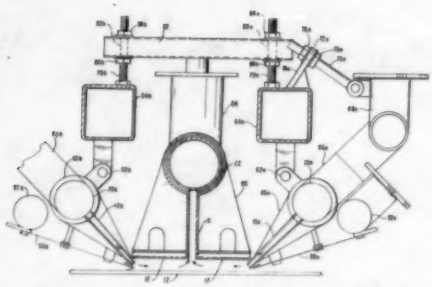
APPARATUS FOR COATING A SUBSTRATE

Georg H. Lindner, Haydnlaan, Netherlands, assignor to Atochem North America, Inc., Somerville, N.J.

Continuation-in-part of Ser. No. 812,873, Dec. 23, 1985, abandoned. This application Jul. 9, 1987, Ser. No. 71,501

Int. Cl.[5] B05B *15/12, 15/08*

U.S. Cl. 118—718 **21 Claims**



1. Apparatus for depositing a film on a surface of a substrate maintained at a deposition temperature comprising:

a pair of opposing coating nozzle means directed toward each other for applying a vaporized coating chemical in a carrier gas to said surface at such a concentration and vapor velocity that deposition of said film is carried out under substantially reaction-rate-controlled conditions, said nozzle means having angle-adjustment means,

each of said nozzle means being positioned adjacent said surface of said substrate with a clearance therebetween which is open to the outside atmosphere and at an angle of from about 30 to about 70 degrees with respect to a normal to said surface such that there is substantially no intermixing of chemical vapors with said outside atmosphere,

supply means for said vaporized coating chemical and carrier gas to said nozzles, and

exhaust means for removing exhaust material.

4,928,628

EGG INOCULATION DEVICE AND METHOD OF USING SAME

Max P. Gassman; David J. Larson, and Darrell W. Trampel, all of Ames, Iowa, assignors to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed Jun. 13, 1988, Ser. No. 205,950

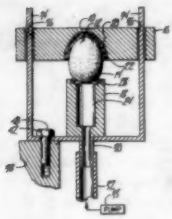
Int. Cl.[5] A01K *45/00*

U.S. Cl. 119—1 **16 Claims**

1. An apparatus for inoculating soluble materials into an egg having a shell, a smaller end and a larger end, comprising:

a support means for holding said egg against movement;

means for supplying said soluble materials to the surface of said egg at positive pore-penetrating pressure including a



transport means having two open ends and a hollow center for carrying said soluble materials to said egg, one of said ends of said transport means abutting one of said ends of said egg.

4,928,629

EGG INOCULATION METHOD

Darrell W. Trampel, Ames, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed Jun. 13, 1988, Ser. No. 205,861

Int. Cl.[5] A01K *29/00*

U.S. Cl. 119—1 **14 Claims**

1. A method of inoculating soluble materials into an egg having a large end and a small end, a shell with pores, and a cuticle surrounding said shell, comprising:

removing at least a portion of said cuticle from said egg;

forcing soluble materials with a pump to said egg having said cuticle removed at a positive pore-penetrating pressure above ambient atmospheric pressure which allows said shell to remain intact so that said soluble materials pass through said pores into said egg.

4,928,630

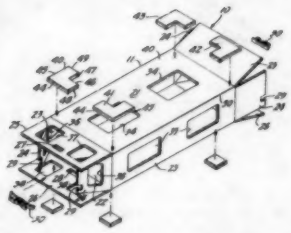
CONTAINER FOR SHIPPING LABORATORY ANIMALS

Julius B. Kupersmit, 299 W. 12th St., New York, N.Y. 10014

Filed Apr. 24, 1985, Ser. No. 726,910

Int. Cl.[5] A01K *31/00*

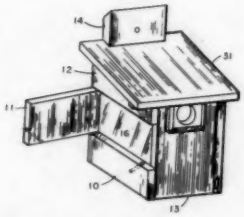
U.S. Cl. 119—17 **3 Claims**



1. A container for shipping laboratory animals comprising: an outer container element and at least one inner container element selectively positionable within said outer container element; said outer container element being formed of corrugated material and including an upper wall, a lower wall, a pair of side walls, and plural flaps forming closures at first and second ends thereof; said upper wall and at least one of said side wall and end flaps having through openings therein for the circulation of ambient air therethrough when said outer con-

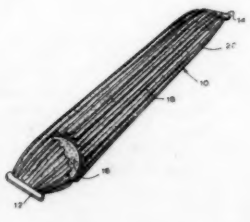
tainer is in assembled closed condition. Said upper wall having an upper surface, a plurality of planar generally L-shaped tabs secured to said upper surface at the corners thereof in such location that a pair of mutually perpendicular corners thereof extend outwardly beyond said corners; whereby upon the stacking of a plurality of said outer containers, said tabs maintain a predetermined distance between said upper surface of one container and a lower surface of a second container supported immediately thereabove to provide a path for the flowing of air through said opening in said upper wall thereof.

4,928,631
BLUEBIRD HOUSE
Cliff A. Smith, 5617 Kenilworth Cir., Shreveport, La. 71129
Filed Feb. 13, 1989, Ser. No. 310,213
Int. Cl.[5] A01K *31/14*
U.S. Cl. 119—23 **1 Claim**



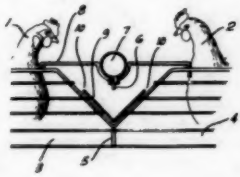
1. In a house for the nesting of birds having, in combination, a box-like structure consisting of left and right sidewalls, a back wall, a front wall, a roof and a floor; an entry-way in said front wall for the ingress and egress of said birds, a transparent window affixed to said front and back walls, said left wall consisting of three sections, one of which is hinged to said back wall and serving as a shutter for said window, said hinged section being of an area equal to, or less than, one third of the area of the entire area of said left wall, said right wall constituting an upper and a lower section, said lower section being removably affixed to the edge portions of said front and back walls to provide emergency access to the nesting area within said box-like structure, and wherein said back wall is provided with vertically disposed channels thereon to assist in diverting rain water away from said house and means for mounting said house to a tree or the like.

4,928,632
CAT TOY
Richard A. Gordon, 95 W. 3rd St., Freeport, N.Y. 11520
Filed Sep. 13, 1988, Ser. No. 243,805
Int. Cl.[5] A01K *29/00*
U.S. Cl. 119—29.5 **20 Claims**



1. An animal toy comprising an elongated tubular container formed of a flexible maleable plastic, said container having disposed in the interior thereof at least one material which exhibits a positive attraction to an animal, the wall of said container being provided with a plurality of random pores which, when said wall is in relaxed condition, are sealed but which open to release a portion of said material from said container when an animal manipulates said container, whereby the attraction of said animal to the top formed by said container is prolonged, and said animal is caused to further bite and play with said toy.

4,928,633
WATER SUPPLY APPARATUS
Norman T. Jennings, Mile End Road, Rouse Hill, New South Wales 2153, Australia
Continuation of Ser. No. 104,823, Oct. 5, 1987, abandoned. This application May 30, 1989, Ser. No. 361,789
Int. Cl.[5] A01K *39/02*
U.S. Cl. 119—75 **5 Claims**



1. A water supply apparatus for caged fowls comprising a water supply channel having a water oulet with nipple means actuable by said fowl to enable said fowl to drink directly from said water outlet;

trough means positioned immediately below said water outlet and extending generally parallel to said water supply channel to catch substantially all water spillage from said water outlet, nipple means and from the beaks and necks of said fowl during drinking;

said trough means being located closely adjacent said water outlet and well above the level of excrement of said caged fowl such that said fowl is prevented from excreting into said trough means; and physical barrier means positioned close to said water oulet and said nipple means to allow said caged fowl to only approach and drink water from said water outlet with their necks substantially horizontal or inclined downwardly toward said trough means so that substantially all spilled water during drinking tends to drip down the necks and beaks of said caged fowl and into said trough means; said water outlet, nipple means and said physical barrier means being at a level with respect to ground bascially vertically aligned with the necks of said fowl when said fowl stands erect.

4,928,634
HONDA BREAKAWAY
Dean J. Voigt, R.R. 1 Box 292, Zap, N. Dak. 58580
Filed Dec. 15, 1988, Ser. No. 284,906
Int. Cl.[5] A01K *29/00*
U.S. Cl. 119—153 **8 Claims**

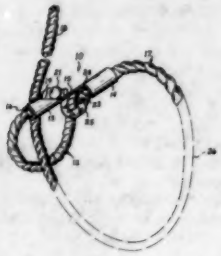
1. A honda breakaway for attaching to a rope in making a lariat, comprising:

an elongated unitary member having first and second ends, a central portion connecting said first and second ends, said first end having means to grasp a first end of a rope;

said second end adapted to grasp and hold an end of said rope and slidably release said rope upon application of a predetermined amount of force

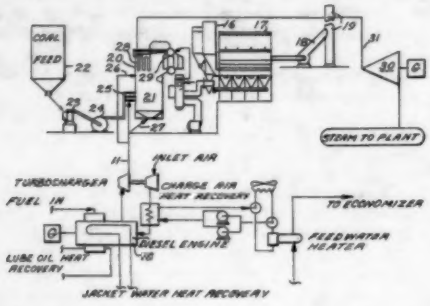
wherein said second end is substantially tubular throughout

its entire length and includes an axial slit completely through said second end permitting said end to flex and



permit said rope to slide through said slit upon application of said predetermined amount of force.

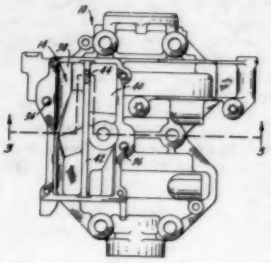
4,928,635
POWER PLANT AND METHOD OF RETROFITTING EXISTING POWER PLANTS
Mack Shelor, 14304 Longate Rd., Midlothian, Va. 23112
Filed Jul. 20, 1989, Ser. No. 383,064
Int. Cl.[5] F22D *1/00*
U.S. Cl. 122—7 R **11 Claims**

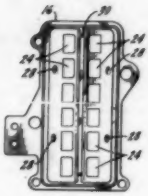


1. A power plant comprising:
a. a coal-fired boiler, having a boiler space, heat exchanging means for generating steam, one or more air ports and exhaust means;
b. an internal combustion engine, having an exhaust means, wherein the exhaust means of the engine are connected to the air ports of the boiler;
c. a thermal NO_x reduction system disposed in said boiler;
d. steam generation means operably connected to said boiler.

4,928,636
EQUALIZER PORT
Lyle E. Weed, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.
Filed Apr. 13, 1989, Ser. No. 337,424
Int. Cl.[5] F02N *17/00*
U.S. Cl. 123—73 R **15 Claims**

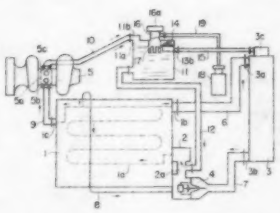
1. In a two-cycle internal combustion crankcase compression engine having a fuel induction system including at least two separate crankcase compartments and a reed block shared by and separating at least two of the crankcase compartments, the reed block having an inlet into each shared compartment, the improvement comprising means communicating between





the crankcase compartments for equalizing pressure between the compartments.

4,928,637
SYSTEM FOR COOLING AN INTERNAL COMBUSTION ENGINE INCLUDING A TURBOCHARGER
Takao Naitoh, and Seidai Nakayama, both of Tokyo, Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan
Filed Aug. 24, 1989, Ser. No. 397,961
Claims priority, application Japan, Aug. 30, 1988, 63-216093
Int. Cl.[5] F01P *3/12*
U.S. Cl. 123—41.31 **2 Claims**



1. In a system for cooling an internal combustion engine having a turbocharger attached thereto wherein said system includes a pump driven by said engine, a water jacket provided for the engine including an engine coolant recirculating circuit between said water jacket for the engine and a radiator, a water jacket provided for said turbocharger, said water jacket for the turbocharger being branched from said water jacket for the engine, and a coolant feeding tank of which water level is set to a position higher than those of the turbocharger and an air venting portion at an upper part of said radiator, said coolant feeding tank including a turbocharger coolant recirculating

circuit between the turbocharger and the water pump, the improvement comprising;

an air chamber provided at an upper part of the coolant feeding tank, said air chamber being communicated with an outlet of the water jacket for the turbocharger via an outlet pipe,

an outlet connected to the tank at a bottom of the tank, said outlet being communicated with a suction side of the pump via a return pipe,

an air venting passage connected to the air chamber in the tank at a higher position than the water level in the coolant feeding tank, said air venting passage being equipped with an one-way valve at an outlet opening portion thereof, an inlet of said air venting passage being communicated with said air venting portion of the radiator via an air venting pipe, and

the air chamber being arranged in the turbocharger coolant recirculating circuit.

4,928,638

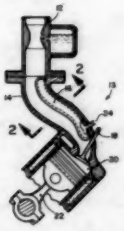
VARIABLE INTAKE MANIFOLD

Wayne W. Overbeck, 329 Ingalls St., Santa Cruz, Calif. 95060

Filed Sep. 12, 1989, Ser. No. 406,368

Int. Cl.[5] F02M *35/00*

U.S. Cl. 123—52 M **9 Claims**



1. A variable intake manifold system for an internal combustion engine comprising:

an inflatable bladder installed within the intake manifold so as to partially cross sectionally occlude a fuel/air mixture flow path;

means for inflating and deflating the bladder so as to occlude a cross-section of said flow path; and

means for controlling the inflating and deflating means in response to preselected engine parameter conditions.

4,928,639

MULTICYLINDER IC ENGINE WITH A STROKE CHARGING DEVICE

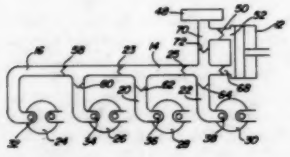
Oskar Schatz, Waldpromenade 16, 8035 Gauting, Fed. Rep. of Germany

Filed Nov. 4, 1988, Ser. No. 267,445

Claims priority, application Fed. Rep. of Germany, Nov. 6, 1987, 3737829

Int. Cl.[5] F02M *35/10*

U.S. Cl. 123—52 MF **8 Claims**



1. A multicylinder IC engine of the piston type with a stroke charging device (12; 12, 74, 92; 92), in the case of which branch ducts (16, 18, 20, 22; 76, 78, 80 and 82) extend from at least an air manifold (14 and 14') to the individual engine cylinders (24, 26, 28 and 30) and are able to be shut off at the respective cylinder (24, 26, 28 and 30) by at least one inlet valve (32, 34, 36 and 38) characterized in that each branch (16, 18, 20, 22; 76, 78, 80 and 82) is provided with a further valve (58, 60, 62, 64; 84, 86, 88 and 90) and additional valve means arranged in said air manifold between the respective sequential branches of branch ducts.

4,928,640

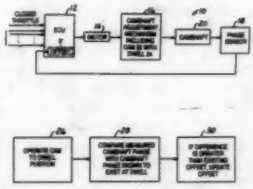
AUTOCALIBRATION OF CAMSHAFT PHASING FEEDBACK IN A VARIABLE VALVE TIMING SYSTEM

Willem N. J. van Vuuren, Williamsburg, and Russell J. Wakeman, Newport News, both of Va., assignors to Siemens-Bendix Automotive Electronics L.P., Troy, Mich.

Filed Jul. 20, 1989, Ser. No. 383,385

Int. Cl.[5] F01L *1/34*

U.S. Cl. 123—90.17 **18 Claims**



1. In a variable valve timing system for an automobile engine wherein a camshaft that operates valves associated with cylinders of the engine is adjustably phased relative to the engine's crankshaft by means of a closed-loop control that includes a sensor that senses the phase of the camshaft relative to the phase of the crankshaft, the improvement comprising autocalibration means for enabling the system to automatically calibrate itself such that discrepancies between the true camshaft phasing relative to the crankshaft and the apparent camshaft phasing as determined by said sensor are substantially eliminated, said autocalibration means comprising means defining a zone of operation for said system at a known phase relation to the camshaft wherein a certain commanded adjustment of the camshaft phasing produces no corresponding adjustment of the camshaft phasing and hence no corresponding change in the camshaft phasing indicated by said sensor, comparison means responsive to this lack of response of the camshaft to the commanded adjustment for comparing the phasing of the camshaft that is being concurrently indicated by said sensor with the known phasing of said zone of operation, and modifying means for modifying the indicated camshaft phasing from said sensor by the amount of said comparison to thereby calibrate said sensor.

4,928,641

LUBRICANT SUPPLYING SYSTEM FOR DOHC TYPE MULTI-CYLINDER INTERNAL COMBUSTION ENGINE

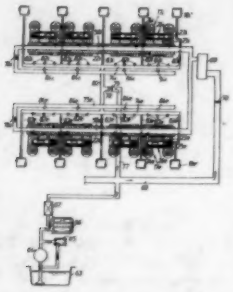
Tomonori Niizato; Tsuneo Tanai; Kazuhiro Kasahara; Tsutomu Saka, and Toshihiro Oikawa, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 27, 1988, Ser. No. 290,313

Claims priority, application Japan, Dec. 28, 1987, 62-200642[U]; Jun. 22, 1988, 63-82587[U]; Jun. 22, 1988, 63-82588[U]; Aug. 1, 1988, 63-102104[U]; Aug. 1, 1988, 63-102105[U]

Int. Cl.[5] F01L *1/26*

U.S. Cl. 123—90.16 6 Claims



1. A lubricant supplying system for a DOHC type multi-cylinder internal combustion engine comprising a plurality of cylinders arranged in series in a cylinder block, a pair of cam shafts parallel to each other and rotatably supported by a cylinder head and cam holders fixed to the cylinder head at opposite sides of the respective cylinders along the cylinder arranging direction, a plurality of cams including low speed cams corresponding to intake and exhaust valves of the respective cylinders and fixed to the cam shafts, a plurality of rocker arms disposed to be slidably contacted with the respective cams and corresponding to each of the intake and exhaust valves of the respective cylinders, and a connection switching mechanism for switching connection and disconnection of the rocker arms in response to a hydraulic pressure to vary operating states of the intake and exhaust valves responsive to an operating state of the engine, wherein a hydraulic pressure supply passage independent from an oil supply passage for supplying a hydraulic pressure to the connection switching mechanism is provided in the cylinder head substantially at a center portion thereof in the arranging direction of the cylinders so as to extend vertically, and a branch oil passage is provided to have intake side and exhaust side portions disposed in one cam holder of substantially central location along the arranging direction of the respective cylinders, the branch oil passage communicating with an upper end of the hydraulic pressure supply passage to supply lubricant to slidably contacting portions of the low speed cams of the respective cylinders for the intake and exhaust valves with the rocker arms and to cam journal portions of the cam shafts.

4,928,642

AUTOMATIC STARTING FLUID INJECTION APPARATUS AND METHOD

Robert W. Atkinson, Normal; John W. Crayton, Washington; James I. Portscheller, Sparland, and Daniel C. Wood, East Peoria, all of Ill., assignors to Caterpillar Inc., Peoria, Ill.

Filed Jun. 19, 1989, Ser. No. 367,999

Int. Cl.[5] F02D *41/06*; F02N *17/08*

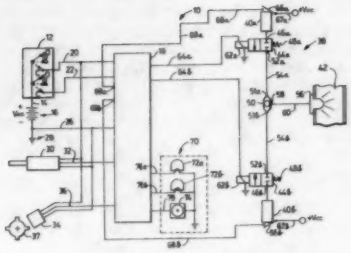
U.S. Cl. 123—180 R 8 Claims

1. An apparatus for automatically injecting starting fluid into a passageway of an internal combustion engine, comprising:

speed sensor means for producing a speed signal in response the speed of said engine;

temperature sensor means for producing a temperature signal in response to the temperature of said engine;

processor means for receiving said temperature and speed signals, calculating an injection time in response to said



engine temperature signal, and producing an injection signal in response to said speed signal for a period of time equal to said calculated injection time; and,

fluid delivery means for receiving said injection signal and injecting said starting fluid into the engine passageway in response to said injection signal.

4,928,643

STARTER HAVING A MANUAL DRIVE FOR INTERNAL COMBUSTION ENGINES

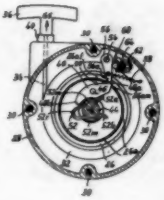
Guenter Kampichler, Ruhstorf, and Erich Eder, Vornbach am Inn, both of Fed. Rep. of Germany, assignors to Motorenfabrik Hatz GmbH & Co. KG, Ruhstorf, Fed. Rep. of Germany

Filed May 10, 1989, Ser. No. 349,697

Claims priority, application Fed. Rep. of Germany, May 11, 1988, 3816099

Int. Cl.[5] F02N *3/02*

U.S. Cl. 123—185 B 4 Claims



1. A rewind or recoil starter for an internal combustion engine which is adapted to be coupled to the engine element to be started, and which is returned to its resting position by a rewind or recoil device after manual operation of its actuating means and after the engine has started, comprising at least one safety means in the starter which, in the event of an unsuccessful starting operation and upon kick-back of said engine element against the starting direction, uncouples the actuating means of the starter from the back-kicking engine element, said starter being equipped with a driven member rigidly seated on said engine element to be started, and with a driving member which, during starting, is driven by way of said actuating means, in the form of a pulley having a cord and a cord handle, to drive said engine element in the starting direction, said safety means comprising a fixedly mounted, spring-loaded decoupler pawl which does not affect the driving engagement between the driven member and the manually operated driving

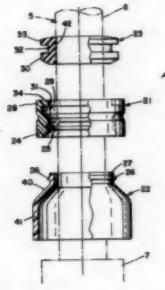
member when the elements of the starter are in their resting positions and during their starting movement, whereas, upon kick-back of the engine element to be started, the decoupler pawl is brought into a decoupling position by means of an element which then kicks back, and thereby releases the driving engagement.

4,928,644

LUBRICATION CONTROL

Gilbert E. Travis, 5287 S. Cleveland Massillon Rd., Norton, Ohio 44203

Filed Jul. 30, 1989, Ser. No. 387,358
Int. Cl.[5] F01L *3/08*
U.S. Cl. 123—188 P **7 Claims**



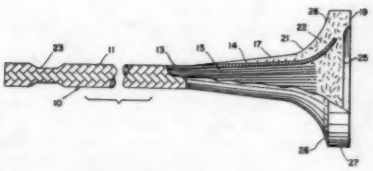
1. A lubricating control for a valve stem reciprocating in a valve guide, comprising:
   a first relatively stiff ring member,
   a second, relatively stiff, annular sleeve member separably engaged with said ring member; and
   a resilient grommet held within said ring member and encircling said valve stem.

4,928,645

CERAMIC COMPOSITE VALVE FOR INTERNAL COMBUSTION ENGINES AND THE LIKE

Philip L. Berneburg, Potomac, Md., and Roy W. Rice, Alexandria, Va., assignors to W.R. Grace & Co.-Conn., New York, N.Y.

Filed Sep. 14, 1989, Ser. No. 406,997
Int. Cl.[5] F01L *3/02*
U.S. Cl. 123—188 AA **26 Claims**



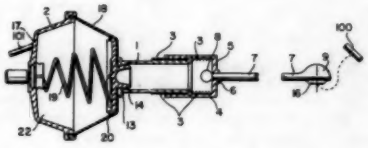
1. A finished ceramic composite valve for an internal combustion engine or the like, or a preform valve, including:
   (a) an elongated valve stem shaped for insertion in the valve guide of an engine and comprising fibrous ceramic sleeving which is packed with an axially aligned unidirectional cluster of ceramic reinforcing fibers; and
   (b) a ceramic bell shaped for mating with the valve seat of an engine and containing discontinuous ceramic fibers; one end of the stem sleeving being molded into the bell to form a valve-shaped structure.

4,928,646

COUPLING APPARATUS FOR A SPEED GOVERNOR

Friedhelm Diller, Rheda-Wiedenbruck, Fed. Rep. of Germany, assignor to Hella KG Hueck & Co., Lippstadt, Fed. Rep. of Germany

Filed May 30, 1989, Ser. No. 358,264
Claims priority, application Fed. Rep. of Germany, May 30, 1988, 3818310
Int. Cl.[5] B60K *31/00*; F02D *11/04*; F02M *19/12*
U.S. Cl. 123—376 **14 Claims**



1. A coupling apparatus for a motor throttle of a type including pieces that are movable relative to one another but which can be more rigidly engaged with one another for coupling a governor positioning drive of a governor with a speed adjusting apparatus of a throttle, said coupling apparatus comprising:
   an adjustment mechanism including a cylindrically formed, elongated, hollow connecting stud connected to the governor positioning drive at a driven end portion and a cylindrically formed, hollow, adjustment piece telescoped to the connecting stud at an opposite driving end portion, the adjustment piece including a cap for covering a hollow cavity of the adjustment piece with a cap opening therein;
   a coupling rod slidably extending through the opening in the adjustment-piece cap, a driven end of the coupling rod directed toward the governor positioning drive having an enlargement thereon that is larger than that portion of the cap opening in which the coupling rod is positioned, a driving end of the coupling rod directed away from the governor positioning drive including a connecting apparatus for coupling the coupling rod with the speed adjustment apparatus.

4,928,647

DUAL ACTING-DOUBLE BREAKOVER THROTTLE LEVER

Tibor J. Villanyi, Columbus, and Kevin W. Westerson, Nashville, both of Ind., assignors to Cummins Engine Company, Inc., Columbus, Ind.

Continuation of Ser. No. 301,057, Jan. 25, 1989, abandoned. This application Nov. 1, 1989, Ser. No. 430,064
Int. Cl.[5] F02D *11/04*
U.S. Cl. 123—400 **12 Claims**

1. A throttle lever assembly for operating a throttle shaft adapted to control the flow of fuel to an internal combustion engine as the throttle shaft is moved between an idle position and a full throttle position in response to a throttle control, comprising
   (a) a throttle lever means adapted to be connected with the throttle shaft for moving the throttle shaft between the idle and the full throttle positions in response to movement of the throttle control;
   (b) throttle link means connected to said throttle lever means and to the throttle control for limiting the degree of force which may be applied to said throttle lever means when the throttle shaft reaches at least one of said idle and full

throttle positions, said throttle link means including a link lever pivotally connected to said throttle lever means, and (c) throttle link stop means for limiting the rotation of said link lever relative to said throttle lever means to a predetermined maximum first breakover position, said throttle

link stop means including a first stop on said link lever positioned to engage the throttle shaft when said link lever reaches said first breakover position, whereby control of said throttle shaft may be continued by the throttle control even if said throttle link means malfunctions.

4,928,648

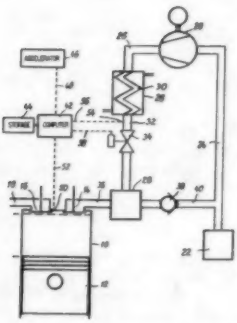
METHOD OF OPERATING AN IC ENGINE AND AN IC ENGINE FOR PERFORMING THE METHOD

Oskar Schatz, Waldpromenade 16, D-8035 Gauting; Georg Mehne, Altenberg 26, D-7162 Gschwend, and Thomas Steldele, Hauzenbergerstrasse 29, D-8000 Munich 21, all of Fed. Rep. of Germany

Filed Nov. 4, 1988, Ser. No. 267,173

Int. Cl.[5] **F02D** *31/00*; **F02M** *51/00*; **F02B** *33/00, 29/00*

U.S. Cl. 123—403 **34 Claims**



1. An IC engine of the piston type, more particularly a reciprocating piston engine, with at least one combustion chamber (**10**), at least one inlet valve (**14**) with an inlet duct (**36**) coupled with said at least one combustion chamber, a charger (**20**) producing a continuous pressure associated with said inlet duct and with a storage space (**28**), an air control valve (**34**) coupled with said inlet duct between the storage space (**28**) and each inlet valve (**14**), said air control valve opens and closes in a way dependent on the ignition frequency of the associated combustion chambers (**10**), means for modifying the phase position of the inlet valve (**14**) and the air control valve (**34**), said means for modifying phase associated with said inlet valve and air control valve for shifting opening of said valves such that a supply of compressed air is concentrated at the start of opening of the inlet valve, compressed air is supplied during full opening of the inlet valve, or compressed air is concentrated at the closing of the inlet valve, and means for supplying non-compressed air to said at least one combustion chamber when said air control valve is closed, said means for supplying non-compressed air bypasses a compress branch of said duct including the charger, storage space and air control valve, and is coupled with said inlet duct, said means for supplying non-compressed air is able to be shut off by a valve means (**38**) when said air control valve is opened.

4,928,649

IGNITION TIMING CONTROL SYSTEM FOR AN AUTOMOTIVE ENGINE

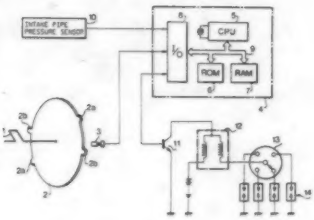
Kunihiro Abe, Higashimurayama, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 26, 1989, Ser. No. 358,164

Claims priority, application Japan, May 31, 1988, 63-133828

Int. Cl.[5] **F02P** *5/15*

U.S. Cl. 123—414 **4 Claims**



1. A system for controlling ignition timing of an internal combustion engine, having a rotary member provided to be rotated in synchronism with a crankshaft of said engine, at least two indicator means formed on said rotary member, and a sensor for sensing said indicator means and for producing signals, comprising:

a memory storing an angle between said two indicator means in a form of $K \cdot 2^n$, where K is resolution of the system and n is a natural number;

first calculator means for calculating a time interval between said indicator means and for producing a time interval signal in binary;

shifting means for shifting the time interval signal by n times and for producing a quotient signal representing the quotient of division of the time interval by the said angle;

second calculator means for calculating an ignition timing based on the quotient signal and for producing an ignition signal; and

an ignition device responsive to the ignition signal for sparking a spark plug of the engine.

4,928,650

OPERATING ARRANGEMENT FOR INTERNAL COMBUSTION ENGINE POPPET VALVES AND THE LIKE

Yutaka Matayoshi; Toru Yoshimura, both of Yokosuka; Shigeru Kamegaya, Tokyo, and Kyugo Hamai, Yokosuka, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed May 28, 1989, Ser. No. 329,846

Claims priority, application Japan, Mar. 28, 1988, 63-40678[U]; Mar. 28, 1988, 63-40680[U]; Mar. 28, 1988, 63-40681; Mar. 28, 1988, 63-40684[U]; Mar. 29, 1988, 63-41288[U]

Int. Cl.[5] **F01L** *1/30, 1/32*

U.S. Cl. 123—90.24 **16 Claims**

1. In a device having a valve, said valve having a valve stem which is reciprocal along an axis:

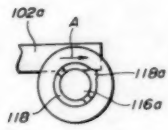
a valve operating mechanism comprising:

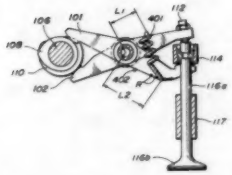
a cam shaft, said cam shaft having first and second cams operatively disposed thereon;

first and second pivotally mounted rocker arms, said first

and second rocker arms each having first ends which are arranged to engage said first and second cams, respectively;

said first rocker arm being operatively connected with said valve in a manner to selectively move the same in a first direction which opens the valve when the high lift portion of said first cam engages a first cam follower formed on said first rocker arm;





said second rocker arm being operatively connected with said valve in a manner to selectively move the same in a second direction which closes the valve when the high lift portion of said second cam engages a second cam follower formed on said second rocker arm; and

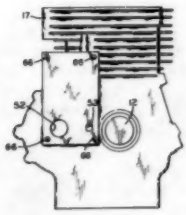
means for producing a force which acts as a finite distance from said axis and which produces a torque which rotates said valve stem about said axis when the valve is being one of opened and closed.

4,928,651

INTEGRAL ENGINE BLOCK AIR COOLED ENGINE OIL COOLER

Peter G. Kronich, Sheboygan, Wis., assignor to Tecumseh Products Company, Tecumseh, Mich.

Filed Jun. 26, 1989, Ser. No. 371,455
Int. Cl.[5] F01M *1/00*
U.S. Cl. 123—196 AB **23 Claims**



1. In an internal combustion engine comprising a crankshaft, a crankcase having an external surface, an oil sump in said crankcase, and a pressure lubrication means for forcing liquid lubricating oil from said oil sump through a lubrication path in the engine, an oil cooler comprising:

a heat exchanger having an inner surface mounted on the external surface of said crankcase, said heat exchanger having an oil passageway therein in flow communication with said lubrication path;

said heat exchanger further having an external surface having a plurality of fins projecting outwardly therefrom;

said lubrication means pumping the liquid oil through said heat exchanger passageway under positive pressure; and

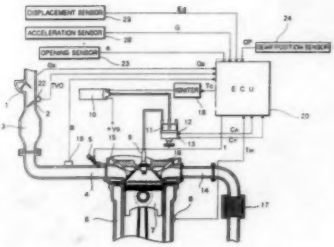
means associated with said engine for creating a flow of circulating air whereby the lubricating oil is cooled by direct convection heat exchange between said fins and said circulating air.

4,928,652

ENGINE CONTROL SYSTEM FOR SUPPRESSING CAR BODY VIBRATION

Yoshiyuki Shinya, Hiroshima; Yoshitaka Tabara, Higashihiroshima; Itaru Okuno, Hiroshima; Tadashi Kaneko, Hiroshima, and Tomomi Watanabe, Hiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Sep. 14, 1988, Ser. No. 244,115
Claims priority, application Japan, Sep. 17, 1987, 62-235969; Jan. 29, 1988, 63-17420
Int. Cl.[5] F02P *1/00*
U.S. Cl. 123—417 **15 Claims**



1. An engine control system for suppressing vibration of a car body by varying engine output torque, comprising:

vibration data detecting means for intermittently detecting data relating to car body vibration;

period setting means for setting a period of car body vibration;

delay time setting means for setting a delay time corresponding to a detection delay time due to the intermittent detection of said vibration data detection means; and

torque control means for controlling engine output torque by advancing a phase of engine output torque control timing by the delay time corresponding to the detection delay time, which is set by said delay time setting means, in each period of car body vibration set by said period setting means, thereby suppressing car vibration.

4,928,653

AIR-FUEL RATIO CONTROL DEVICE FOR AN INTERNAL COMBUSTION ENGINE

Satoru Ohkubo, Amagasaki, and Toshio Iwata, Himeji, both of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Mar. 27, 1989, Ser. No. 329,287
Claims priority, application Japan, Apr. 19, 1988, 63-97865
Int. Cl.[5] F02D *41/14*
U.S. Cl. 123—435 **17 Claims**

1. A control device for controlling an air-to-fuel ratio of a mixture of fuel and air supplied to an internal combustion engine, comprising:

air quantity detecting means for measuring a quantity of air supplied to said internal combustion engine;

crank angle sensor means for detecting a crank angle (θ) of said internal combustion engine;

pressure sensor means for detecting a pressure (P) within a cylinder of said internal combustion engine;

feedback value computation means, coupled to outputs of said pressure sensor means and said crank angle sensor means, for computing an actual ratio of a maximum rate of pressure change $(dP/d\theta)max$ within said cylinder with respect to said crank angle during a predetermined interval of time within a cycle of strokes in said cylinder to a maximum pressure (Pmax) within said cylinder during the same predetermined interval of time within a cycle of strokes in said cylinder;

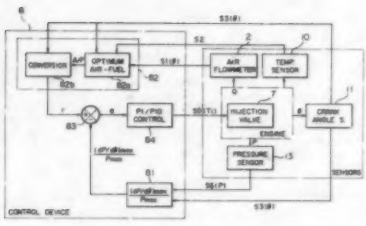
optimum air-to-fuel ratio computation means, coupled to outputs of said air quantity detecting means and said crank angle sensor means, for determining an optimum air-to-fuel ratio corresponding to an operating condition of said internal combustion engine determined by parameters including said outputs of said air quantity detecting means and said crank angle sensor means;

conversion means, coupled to an output of said optimum air-to-fuel ratio computation means, for determining a value of a target ratio of the maximum rate of pressure change $(dP/d\theta)max$ within said cylinder with respect to said crank angle during said predetermined interval of time within a cycle of strokes in said cylinder to the maximum pressure (Pmax) within said cylinder during the same predetermined interval of time within a cycle of strokes in said cylinder by means of a relationship between values of air-to-fuel ratio and values of said ratio of the maximum rate of pressure change $(dP/d\theta)max$ within said cylinder with respect to the crank angle during said predetermined interval of time to the maximum pressure (Pmax) within said cylinder during the same predetermined interval of time within a cycle of strokes in said cylinder, said target ratio corresponding to said optimum air-to-fuel ratio determined by said optimum air-to-fuel ratio computation means;

error computation means, coupled to said feedback value computation means and said conversion means, for computing a deviation of said actual ratio, computed by said feedback value computation means, with respect to said target value determined by said conversion means;

fuel injection means for injecting an amount of fuel into an air intake passage coupled to said cylinder of the internal combustion engine; and

control means, coupled to an output of said error computation means, for controlling said amount of fuel injected by said fuel injection means to reduce said deviation, outputted from said error computation means, of said actual ratio with respect to said target ratio.

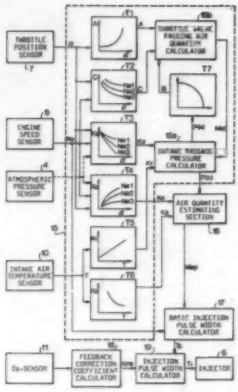


4,928,654

FUEL INJECTION CONTROL SYSTEM FOR AN AUTOMOTIVE ENGINE

Hiroshi Hosaka, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 19, 1988, Ser. No. 287,473
Claims priority, application Japan, Dec. 28, 1987, 62-332627
Int. Cl.[5] F02M 51/00
U.S. Cl. 123—486 8 Claims



1. A system for controlling fuel injection of an engine for a motor vehicle having an intake system comprising an intake passage, a throttle valve provided in the intake passage, and a fuel injector, the controlling system comprising

engine speed detector means for detecting engine speed and for producing an engine speed signal;

throttle position detector means for detecting throttle position and for producing a throttle position signal,

intake air temperature detector means for detecting intake air temperature and for producing an intake air temperature signal,

first calculator means responsive to the engine speed signal, throttle position signal and intake air temperature signal for calculating pressure in the intake passage pressure based on a model equation of the intake system representing fluctuation of the intake passage pressure as a function of variations of the engine speed, throttle position and intake air temperature and for producing an intake passage pressure signal corresponding to the calculated intake passage pressure,

second calculating means responsive to the engine speed signal, throttle position signal, intake air temperature signal and intake passage pressure signal for calculating an engine inducted air quantity in accordance with an equation of state of fluid in the intake passage and for producing an inducted air quantity signal corresponding to the calculated engine inducted air quantity, and

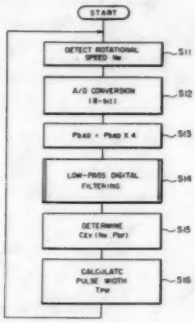
third calculator means responsive to the engine speed signal and inducted air quantity signal for calculating an injection pulse width to inject an optimum amount of fuel from the injector.

4,928,655

FUEL INJECTION CONTROLLER FOR AN INTERNAL COMBUSTION ENGINE

Hajime Kako, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 30, 1989, Ser. No. 358,116
Claims priority, application Japan, Jun. 15, 1988, 63-147278
Int. Cl.[5] F02D *41/18, 41/28*
U.S. Cl. 123—488 **3 Claims**



1. A fuel controller for an engine equipped with a pressure sensor which generates an analog signal corresponding to the pressure in an air intake pipe of the engine, the fuel controller comprising:

an N-bit A/D converter which performs A/D conversion of the analog signal of the pressure sensor and generates an N-bit digital signal;

multiplying means for multiplying the N-bit digital signal by a prescribed constant to obtain a digital output signal having at least (N + 1) bits;

a low-pass digital filter which filters the output signal of said multiplying means and generates a filtered output; and

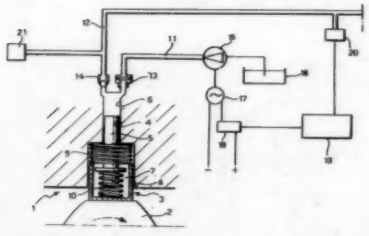
control means for controlling the operation of a fuel injector of the engine in accordance with the filtered output so as to obtain a desired air/fuel ratio.

4,928,656

FUEL-INJECTION PUMP WITH VARIABLE CYLINDER CAPACITY FOR DIESEL ENGINE INJECTION SYSTEMS

Francesco Paolo Ausiello, Turin, Italy, assignor to Weber S.r.l., Turin, Italy

Filed Dec. 2, 1988, Ser. No. 279,209
Claims priority, application Italy, Dec. 9, 1987, 68053 A/87
Int. Cl.[5] F02M *39/00*
U.S. Cl. 123—504 **3 Claims**



1. A fuel-injected device for diesel engine injection systems, comprising:

means defining a fuel-injection pump cylinder (4);

a pumping piston (5) mounted for floating sliding movement in said cylinder between a bottom dead center position and a top dead center position, said pumping piston having one end defining a pumping chamber (6) in said cylinder, and an opposite end;

a rotatably mounted eccentric (2);

a tappet member (8) engaged with said eccentric for reciprocal movement with rotation of said eccentric;

biasing means (10) engaged between said tappet member and said opposite end of said piston for transmitting reciprocal movement of said tappet member into equalized and floating reciprocal movement of said piston;

a fuel-intake duct (11) having an intake valve (13) therein and being connected to said pumping chamber for supplying fuel thereto;

a fuel delivery (12) having a delivery valve (14) therein and being connected to said pumping chamber for delivering fuel therefrom, said fuel delivery duct being adapted for connection to a fuel engine injection system for supplying fuel to the fuel engine injection system;

an electric supply pump (15) connected to said fuel intake duct for supplying fuel from a fuel supply tank to the pumping chamber through said intake valve at a variable pressure;

electronic modulation means (17, 18, 19) connected to said electric supply pump for varying the pressure of fuel supplied to said pumping chamber, for varying the bottom dead center position of said piston as it is biased by said biasing means and as a function of pressure in said pumping chamber and before the movement of said piston for executing a stroke for pumping the fuel from said pumping chamber through said delivery valve to said fuel delivery duct; and

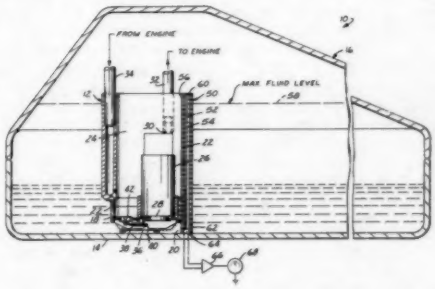
an electrical pressure sensor (20) connected to said fuel delivery duct for sensing the pressure therein and connected to said electronic modulation means for adjusting the effect of said electronic modulation means on said electric supply pump.

4,928,657

IN-TANK FUEL RESERVOIR WITH FUEL LEVEL SENSOR

Brian K. Asselin, Caro, Mich., assignor to Walbro Corporation, Cass City, Mich.

Filed Mar. 2, 1989, Ser. No. 318,126
Int. Cl.[5] F02M *39/00*
U.S. Cl. 123—514 **13 Claims**



1. A fuel delivery system for automotive engine and like applications comprising: an electric-motor fuel pump for positioning within a fuel tank and having an inlet and an outlet for feeding fuel under pressure to an engine, the tank having a maximum design fuel level, means for returning excess fuel from the engine to the tank, and means for sensing fuel level within the tank, characterized that said level-sensing means comprises:

means positioned at a lower portion of the tank responsive to fuel head pressure within the surrounding tank for providing an electrical signal as a function thereof, and means responsive to said electrical signal for indicating fuel level in the tank,

said level-sensing means comprising reference head pressure means, including a reference column for holding fuel and means for feeding fuel returned from the engine to said reference column for maintaining fuel level in said reference column above said maximum design fuel level, said pressure-responsive means being responsive to fuel head pressure in said reference column in comparison to head pressure in the tank.

4,928,658

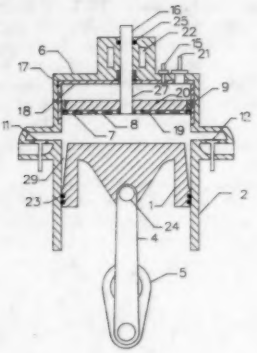
REGENERATIVE INTERNAL COMBUSTION ENGINE

Allan J. Ferrenberg, 7829 Failbrook Ave., Canoga Park, Calif. 91304, and William T. Webber, 30704 Davey Jones Dr., Agoura, Calif. 91301

Division of Ser. No. 782,959, Oct. 2, 1985, Pat. No. 4,790,284. This application Jun. 10, 1988, Ser. No. 205,287

Int. Cl.[5] F02G *5/00*

U.S. Cl. 123—543 **16 Claims**



1. A process for operating a thermally regenerated reciprocating cyclic internal combustion engine having a rotating power output shaft composed of a number of similar working units, each working unit comprising (a) a cylinder closed at one end by a cylinder head, with a number of intake valves to draw cool fresh air into the cylinder, and with a number of exhaust valves to exhaust the spent combustion gases from the cylinder, said intake valves and exhaust valves communicating with the cylinder portion close to the cylinder head; (b) a first means for opening and closing said intake valves and exhaust valves in a predetermined manner once in each engine cycle; (c) a piston inside the cylinder moving along the axis of the cylinder in a reciprocating manner toward and away from the cylinder head between the top dead center position closest to the cylinder head and the bottom dead center position furthest away from the cylinder head, said piston being connected by a second means to the power output shaft, where said second means translates the reciprocating motion of said piston to rotation of the power output shaft; (d) a thermal regenerator inside the cylinder between the cylinder head and the piston, capable of being moved in predetermined cyclic reciprocating motion along the axis of the cylinder and comprising a permeable core and other structure to absorb heat from the hot combustion gases when moved in one direction, and to transfer the absorbed heat to the cool fresh air when moved in the opposite direction; (e) a third means for imparting a predetermined periodic motion to said thermal regenerator; (f) an injection means for injecting combustible fuel into the cylinder, said injection means communicating with the cylinder portion and cylinder head but closer to piston to dead center; and (g) an ignition means for igniting the mixture of said air and said fuel in the cylinder, said ignition means communicating with the cylinder portioned cylinder head but closer to piston top dead center, causing said fuel to be ignited and combusted in the cylinder portion between the regenerator and the piston;

in a two-stroke cycle comprising piston motion from top dead center to bottom dead center back and forth once and comprising the steps of:

opening the intake valves with the exhaust valves closed, the regenerator near the cylinder head and the piston near bottom dead center;

moving the regenerator to a position close to the piston, near bottom dead center, thereby transferring high temperature heat from the combustion gases in the cylinder into the regenerator;

drawing fresh air into the cylinder by the reduction in pressure and volume caused by the transfer of heat from the working fluid to the regenerator;

closing the intake valves with the piston and regenerator near bottom dead center;

moving the piston to a position near top dead center, while simultaneously moving the regenerator in the same direction closely ahead of the piston, thereby compressing the air in the cylinder;

moving the regenerator from its position close to the piston to a position close to the cylinder head, thereby causing the compressed air to flow into and through the regenerator, thereby transferring stored high temperature heat from the regenerator into the compressed air;

injecting fuel using the injection means into the compressed, regeneratively heated air in the cylinder between the regenerator and the piston head;

igniting and burning the fuel-air mixture using the ignition means to form hot combustion gases with the piston near top dead center;

extracting work from the hot combustion gases which expand and push the piston to near bottom dead center while simultaneously the regenerator is maintained in its position close to the cylinder head;

opening the exhaust valves, permitting the hot combustion gases at high pressure to flow through the regenerator and out of the engine through the exhaust valves, thereby transferring high temperature heat from the combustion gases into the re regenerator; and

closing the exhaust valves.

4,928,659

APPARATUS FOR SUPPLYING AIR-FUEL MIXTURE IN INTERNAL COMBUSTION ENGINE

Yukihiro Ohmura; Yoshiyuki Kobayashi; Keiji Hosoi, and Kazuharu Shimoda, all of Shizuoka, Japan, assignors to Suzuki Jidosha Kogyo Kabushiki Kaisha, Shizuoka, Japan

Filed Apr. 28, 1989, Ser. No. 345,464

Claims priority, application Japan, Jul. 14, 1988, 63-176139

Int. Cl.[5] F02M *23/10*

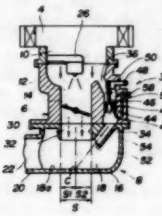
U.S. Cl. 123—588 **3 Claims**

1. An apparatus for supplying an air-fuel mixture in an internal combustion engine, comprising:

a pipe member provided in a collecting passageway of an intake manifold collecting pipe, said pipe member being provided so as to form an extension passageway having a discharge end port opening into said collecting passageway, said extension passageway having an inlet end port which communicates with a discharge end opening of an intake passageway formed in a throttle body of an internal combustion engine; and

an auxiliary air passageway formed in said pipe member which bypasses a throttle valve of the throttle body by passing through the inside of said pipe member, said auxiliary air passageway terminating in an auxiliary air outlet, said auxiliary air outlet being disposed on an opposite side of said extension passageway from the engine cylinder and

said auxiliary air outlet being oriented so as to discharge a stream of auxiliary air toward a center of collision located substantially at the center of a region of a side surface of



the collecting passageway where the air-fuel mixture flowing through the extension passageway collides with said side surface.

4,928,660

PROTECTIVE CASE FOR COMBINATION IGNITION COIL AND ELECTRONIC CONTROL

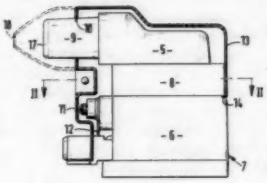
Gerhard Söhner, Geradstetten; Helmut Roth, Schwieberdingen; Hartmut Brammer, Vaihingen; Richard Schleupen, Grossingersheim, and Karl-Heinz Nübel, Schwieberdingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Mar. 23, 1989, Ser. No. 327,816

Claims priority, application Fed. Rep. of Germany, Apr. 2, 1988, 3811216

Int. Cl.[5] F02P *15/00*

U.S. Cl. 123—647 **8 Claims**



1. An elastic protective case for a vehicle ignition system having an ignition coil and an electronic control device, comprising, in accordance with the invention,

an integrally formed enclosure **(13)** defining a portion shaped to receive and secure said ignition coil **(5)**; a portion shaped to receive and secure said electronic control device **(6)**, said portions defining therebetween a space for electrical terminals **(11)** and conductors **(12)** interconnecting said coil **(5)** and said electronic control device.

4,928,661

COCKING DEVICE FOR A COMPRESSED AIR WEAPON

Wolfgang Bordt, Ulm, and Friedrich Gerstenberger, Duernach, both of Fed. Rep. of Germany, assignors to J. G. Anschuetz GmbH, Ulm, Fed. Rep. of Germany

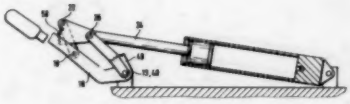
Filed Mar. 17, 1989, Ser. No. 324,666

Claims priority, application Fed. Rep. of Germany, Mar. 18, 1988, 3809239

Int. Cl.[5] F41B *11/00*

U.S. Cl. 124—69 **5 Claims**

1. A cocking assembly in combination with a compression assembly of a compressed air weapon having a rod extending from a piston of the compression assembly, the cocking assembly comprising a cocking member pivotally connected to the weapon, a link member pivotally connected to one end thereof to the cocking member and at an opposite end thereof to said rod, and a toggle arm having one end pivotally connected to the weapon and another end pivotally connected to the rod



between the connection thereto of the link member and the piston.

4,928,662

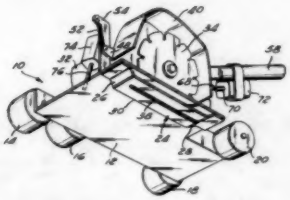
SKID PLATE FOR CUTTING UNHARDENED CONCRETE

Edward Chiuminatta, and Alan R. Chiuminatta, both of 6677 Columbus, Riverside, Calif. 92504

Continuation of Ser. No. 185,055, Apr. 22, 1988, Pat. No. 4,889,675, which is a continuation of Ser. No. 843,779, Mar. 25, 1988, Pat. No. 4,769,201. This application Nov. 23, 1988, Ser. No. 275,428

Int. Cl.[5] B28D *1/04*

U.S. Cl. 125—13.01 **19 Claims**



1. A skid plate for use with a saw, comprising:

a skid plate having a slot therein through which a rotating cutting blade extends to cut a surface, the slot having a closed leading end which contacts said surface during cutting, sides extending beyond the cutting edge of the cutting blade, and a trailing end which is not in contact with said surface during cutting, when the entire skid plate is resting on the surface being cut.

4,928,663

ENHANCED AIR-FLOW CONVECTION OVEN

Ira Nevin, Eastchester, and Narendra Nath, Copiague, both of N.Y., assignors to Bakers Pride Oven Co., New Rochelle, N.Y.

Filed Jan. 31, 1989, Ser. No. 304,770

Int. Cl.[5] F24C *15/32*; **A21B** *1/00*

U.S. Cl. 126—21 A **19 Claims**

1. An enhanced air flow convection oven comprising:

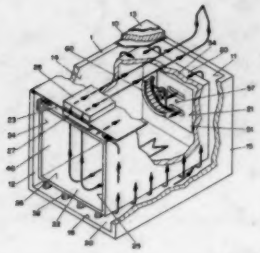
an oven chamber enclosed by an oven chamber liner having a top, a bottom, two sides, a back with an air inlet opening therethrough effectively located between an upper and lower portion thereof, and an air outlet opening;

a heat source located outside said oven chamber liner;

a thermally insulated outer shell, circumscribing said oven chamber liner at a distance from said oven chamber liner forming a space between said oven chamber liner and the outer shell, said space formed along the sides, top, and upper and lower portions of the back of said oven chamber liner for allowing air to flow from said heat source, through said space and into the air inlet opening;

a blower wheel assembly mounted for rotation within the oven chamber liner adjacent to said air inlet opening, said

blower wheel assembly capable of mixing air from within the oven chamber liner with air from the air inlet opening within the blower wheel assembly;



wherein air heated by the heat source moves along the sides, top and back of the oven chamber liner into the air inlet opening where it is mixed within the blower wheel assembly with air from within the oven chamber to provide for balanced heat.

4,928,664

PULSE COMBUSTION HEATING APPARATUS

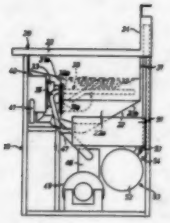
Hiroshi Nishino; Susumu Ejiri, and Nobuyoshi Yokoyama, all of Nagoya, Japan, assignors to Paloma Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Sep. 1, 1989, Ser. No. 401,913

Claims priority, application Japan, Sep. 2, 1988, 63-116334[U]

Int. Cl.[5] A47J *27/00*

U.S. Cl. 126—391 **5 Claims**



1. A pulse combustion heating apparatus comprising a liquid vessel assembled within a support frame to store an amount of liquid such as cooking oil or other fluid medium to be heated, and a pulse combustion burner mounted to said vessel and having a combustion chamber secured at its inlet end to a side wall of said vessel and immersed in the liquid in said vessel and at least a pair of tailpipes each connected at their inner ends to an exhaust port of said combustion chamber in such a manner that said tailpipes are arranged symmetrically in said vessel and immersed in the liquid and being extended outwardly from said vessel,

wherein said vessel has a pair of parallel bottom walls inclined downwardly inwardly toward the center of said vessel, and a pair of cylindrical decouplers are housed in a pair of spaces just below the bottom walls of said vessel within said support frame, said decouplers being connected to each exhaust end of said tailpipes.

4,928,665

LIGHT TRANSMISSIVE INSULATION APPARATUS

Shimon Klier, Simat Magal 4, Savyon, and Ofer Novik, Rehovot, both of Israel, assignors to Shimon Klier, Savyon, Israel

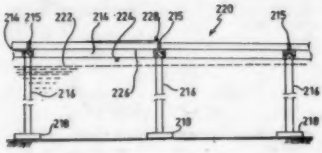
Continuation of Ser. No. 82,237, Aug. 6, 1987, Pat. No. 4,815,442, which is a continuation-in-part of Ser. No. 839,967, Mar. 17, 1986, Pat. No. 4,719,902, which is a continuation-in-part of Ser. No. 800,915, Nov. 25, 1985, abandoned, which is a continuation of Ser. No. 541,119, Oct. 12, 1983, abandoned, which is a continuation-in-part of Ser. No. 363,451, Mar. 30, 1982, Pat. No. 4,480,632. This application Feb. 10, 1989, Ser. No. 308,738

Claims priority, application Israel, Mar. 30, 1981, 62528; Aug. 27, 1981, 63678

The portion of the term of this patent subsequent to Mar. 28, 2006, has been disclaimed.

Int. Cl.[5] F24J *2/42*

U.S. Cl. 126—415 **15 Claims**



1. A solar collector comprising:

a body of material sought to be heated;

a layer of solar spectrum radiation transmissive insulation; and

means for supporting said layer of solar spectrum radiation transmissive insulation between said body of material and a source of solar radiation and in spaced relationship with said body of material, said layer of solar spectrum radiation transmissive insulation comprising an array of cells operative to minimize heat losses from said body of material through convection and conduction, and being generally transmissive to solar spectrum radiation and generally opaque to thermal radiation, said array of cells also being coated with a coating operative to reduce scattering of incoming solar radiation and to enhance absorption of radiated thermal radiation by said cells.

4,928,666

CONTAINER FOR ACCOMMODATING A SOLAR RAY-COLLECTING DEVICE

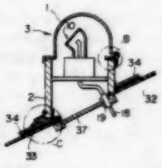
Kei Mori, 3-16-3-501, Kaminoge, Setagaya-ku, Tokyo; Hakaru Akaishi, Osaka; Kenji Kakihara, Osaka, and Yoshiro Kitayama, Osaka, all of Japan, assignors to Kei Mori, Tokyo, Japan

Filed Sep. 19, 1988, Ser. No. 246,566

Claims priority, application Japan, Sep. 28, 1987, 62-243254

Int. Cl.[5] F24J *2/08*

U.S. Cl. 126—440 **3 Claims**



1. A solar ray-collecting device mountable on a roof of a building in which said roof is inclined relative to horizontal,

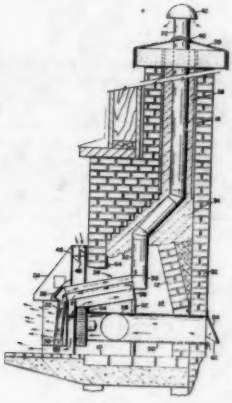
comprising a cylindrical body having a longitudinal axis and upper and lower longitudinal ends, a transparent dome, mounting means mounting said transparent dome on said upper longitudinal end of said cylindrical body, said mounting means comprising a flange extending from said transparent dome, a receptacle member on said upper longitudinal end of said cylindrical body, a joint member interposed between said flange and said receptacle member, first fastening means fastening said joint member to said flange, and second fastening means fastening said joint member and said receptacle member to said upper longitudinal end of said cylindrical body, solar ray-collecting means disposed within said transparent dome, said lower longitudinal end of said cylindrical body being disposed at an inclined angle relative to said longitudinal axis of said cylindrical body, said inclined angle corresponding to the incline of said inclined roof, securing means connected to said lower longitudinal end of said cylindrical body for securing said cylindrical body to said inclined roof such that said lower end of said cylindrical body is thereby mountable on said inclined roof with said longitudinal axis of said cylindrical body being disposed vertically upright, said solar ray-collecting means comprising an optical conductor cable means passing through said cylindrical body and extending through an opening in said roof to thereby conduct collected solar rays to the interior of said building.

4,928,667

GAS FIRE HEATING UNIT

William S. Shaw, Prince George, Canada, assignor to Tri Fire Holdings, Ltd., Prince George, Canada

Filed Sep. 12, 1989, Ser. No. 406,016
Int. Cl.[5] F24B 7/00
U.S. Cl. 126—512 **10 Claims**



1. A space heater for a structure adapted to be mounted in the fire box of a fireplace or as a free standing unit comprising:

a housing having a base, side walls and a rear wall;

a gas burner mounted in said housing on the base;

and a plurality of ceramic radiants covering the front of said housing and forming a front wall thereof so that when gas is consumed at said burner the radiants will be heated;

a hood mounted over said housing and defining a collection plenum means for collecting the hot products of combustion when gas is consumed in said housing;

a flue and a flue plenum in communication therewith;

a concertina heat exchanger having a plurality of inlets in communication with said collection plenum and a plurality of outlets at an opposite end thereof in communication with said flue plenum, said heat exchanger further defining a plurality of inlets for air to be heated adjacent the outlets and a plurality of outlets for heated air adjacent the inlets, said heat exchanger further includes a plurality of first and second passages for combustion products and air to be heated, respectively, wherein the first and second passages are in heat exchange relationship with one another;

blower means in communication with the heat exchanger inlets for supplying air to be heated thereto and circulating duct means in communication with the heated air outlets for directing said heated air into the space to be heated;

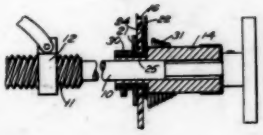
insulating means surrounding said flue, and thermostatic control means coupled to said blower means for terminating the air supplied by said means to the heat exchanger when the temperature in said flue falls below a predetermined limit.

4,928,668

FIREPLACE DAMPER INDICATOR

Frederick J. Reusch, Sr., Melville Towers, Apt. 616, New Bedford, Mass. 02740, assignor to Frederick J. Reusch, Sr., New Bedford; J. Reusch, Jr. and Paul R. Reusch, Sr., Mattepoisett, all of, Mass.

Filed Oct. 23, 1989, Ser. No. 425,112
Int. Cl.[5] F24B 7/00
U.S. Cl. 126—537 **2 Claims**



1. A fireplace damper indicator comprising a housing having a central cylindrical coupler mounted therein for rotation, said coupler having a bore to receive a damper operating rod, means gripping the rod, a contact arm fixed to the shaft, spiral contact wire means arranged to engage the arm, a no-contact area adjacent a circular path traversed by the arm, indicator means, a source of e.m.f., means establishing a circuit with the arm, wire, e.m.f and an indicator whereby the indicator shows open or closed damper position.

4,928,669

STRAIGHTENING DEVICE FOR FLEXIBLE TUBULAR STRUCTURES

Michael J. Sullivan, 1116 Radcliffe Ave., Kingsport, Tenn. 37664-2026

Filed Jun. 26, 1989, Ser. No. 371,311
Int. Cl.[5] A61B 1/00
U.S. Cl. 128—4 **6 Claims**

1. A straightening device for tubular medical instruments or the like, comprising an elongated cable having shoulder means adjacent its distal end, an elongated, normally flexible, non-compressible, coiled wire sheath surrounding said cable in sliding contact therewith, the adjacent coils of said sheath always contacting each other over at least a portion of their adjacent surfaces, the distance end of said sheath being in abutment with said distal shoulder means of said cable, bearing block means having bore means slidably receiving a proximal end portion of said cable, slide bar means axially, non-rotatably

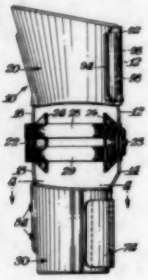
slidably mounted in said bore means, said proximal end portion of said cable being affixed to said slide bar means, stop means on said block means in abutment with the proximal end of said sheath, a threaded shaft segment affixed to said slide bar means and slidably extending through a distal portion of said bore means, and nut means threadedly mounted on said segment and adapted to abut said block means when rotated relative to said segment to tension said cable and apply straightening force to said sheath.

4,928,670

HUMAN KNEE JOINT STABILIZING ORTHOSIS WITH SEMI-RIGID, SUBSTANTIAL ENCASEMENT MEANS FOR LOWER LEG

Richard DeLorenzo, 3246 Champions Dr., Wilmington, Del. 19808

Filed Dec. 6, 1988, Ser. No. 280,677
Int. Cl.[5] A61F *3/00*
U.S. Cl. 128—80 C **15 Claims**



1. A human knee stabilizer comprising:

a semi-rigid, posteriorly open U-shaped, upper leg-engaging cuff having medial and lateral sides;

a semi-rigid, generally triangular prism-shaped lower leg-engaging cuff constructed and arranged such that: the vertex of the triangular cross-section of the triangular prism-shaped lower leg-engaging cuff is generally located at the sharp anterior border of the shaft of the wearer's tibia and the lateral and medial faces corresponding to the lateral and medial sides of said triangular cross-section engage the lateral and medial sides of the wearer's lower leg, while the posterior face corresponding to the base of said triangular cross-section engages the posterior of the wearer's calf muscle, and said cuff encircles at least 315° of the wearer's calf and shin and thereby defines a vertically-extending gap in said cuff remote from said vertex and in closely-spaced relation to the corner at the intersection of said base and a said of said triangular cross-section, to facillate engagement of the wearer's lower leg with said cuff, the interior medial face of the lower leg-engaging cuff including a vertically-extending, substantially planar portion, medially extending from said vertex, for conforming to the anterior, planar-shaped medial flare of the wearer's tibia;

rigid lateral and medial upper support arms integral with the lateral and media sides of the upper leg-engaging cuff and extending downwardly from said sides;

rigid lateral and medial lower support arms integral with the lateral and medial faces of said lower leg-engaging cuff and extending upwardly from said faces;

lateral and medial polycentric pivot means connecting the upper support arms to the lower support arms to complete the lateral and medial support and to provide range-of-motion control, each said polycentric pivot means including an inner face arranged to face the wearer's lateral or medial femoral condyle;

at least one pre-molded condylar pad attached to a said inner face for engaging a said condyle;

an interior generally inelastic strap attached at one end to one of the two faces of the lower leg-engaging cuff which is adjacent said vertically-extending gap and having a free end attachable to the other face adjacent said vertically extending gap to complete the encirclement of the wearer's lower leg when the lower leg-engaging cuff is in position on the wearer's lower leg;

an exterior, elastic strap attached at one end to a face of the lower leg-engaging cuff and having a free end attachable to a different face, for superposition upon said interior generally inelastic strap when the free end of said inelastic strap is attached; and

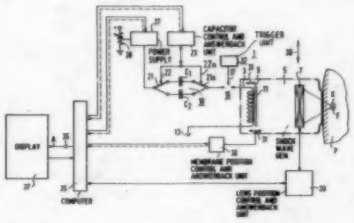
an elastic strap attached at one end on one side of the posterior opening of the upper leg-engaging cuff and having a free end attachable to the other side of the posterior opening to complete the encirclement of the wearer's upper leg.

4,928,671

SHOCK WAVE GENERATOR FOR GENERATING AN ACOUSTICAL SHOCK WAVE PULSE

Helmut Reichenberger, Eckental, and Georg Naser, Zirndorf, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jul. 10, 1987, Ser. No. 71,992
Claims priority, application Fed. Rep. of Germany, Jul. 16, 1986, 3624069; Apr. 7, 1987, 3711639
Int. Cl.[5] A61B *17/22*
U.S. Cl. 128—24 A **20 Claims**



1. A shock wave generator comprising:

means for generating a shock wave pulse having a path of travel;

a plurality of acoustic lenses having respectively different concentrating characteristics;

means for holding said lenses; and

means for moving said means for holding in a direction transverse to said path of travel for selectively introducing at least one of said lenses into said path of said shock wave pulse from a standby position out of said path of said shock wave pulse.

4,928,672

SHOCKWAVE SOURCE HAVING A CENTRALLY DISPOSED ULTRASOUND LOCATING SYSTEM

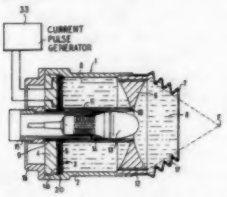
Franz Grasser, Eggolsheim; Helmut Reichenberger, Eckental; Dietrich Hassler, Uttenreuth; Georg Naser, Zirndorf, and Erhard Schmidt, Erlangen, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jun. 23, 1988, Ser. No. 210,334

Claims priority, application Fed. Rep. of Germany, Jul. 31, 1987, 3725533; Aug. 19, 1987, 3727691

Int. Cl.[5] A61H *1/00*

U.S. Cl. 128—24 A **12 Claims**



1. A shockwave generator for extracorporeal disintegration of a calculus in a patient comprising:

a housing;

a flat coil in said housing having a central opening therein;

an electrically conductive membrane having a central opening therein;

means for insulating said membrane from said coil and having a central opening therein;

means for applying a current pulse to said coil to cause said membrane to be rapidly repelled therefrom, thereby generating a pressure pulse;

means in said housing adapted for focussing said pressure pulse to a calculus in a patient;

means in said housing disposed between said membrane and said patient adapted for coupling said pressure pulse into said patient;

ultrasound means for transmitting and receiving ultrasound signals to and from said patient, all of said central openings of said coil, said membrane and said means for insulating being in registry, and said ultrasound means having an ultrasound head received in said central openings.

4,928,673

ELECTRIC PASSIVE PEDAL EXERCISER

Floyd Heneger, 139 S. 8th, Brighton, Colo. 80601

Filed Apr. 3, 1989, Ser. No. 332,046

Int. Cl.[5] A61H *1/02*

U.S. Cl. 128—25 R **2 Claims**

1. A light weight portable electric passive exercise device comprising:

a light weight portable frame means having a handle for ease of use and portability by a paraplegic;

a crank assembly housing mounted on said frame means;

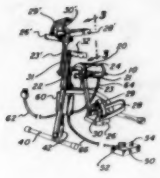
a crank assembly means rotatably mounted in said crank assembly housing;

a motor mounted on said crank assembly housing and a gear means drivably connected said motor to said crank assembly means for rotatably driving said crank assembly;

said motor electrically connected with a rheostat for controlling the speed of said crank assembly means;

a tilt switch means electrically interconnected with said motor to automatically disengage power if said exercise device becomes unbalanced;

and a reset switch electrically interconnected with said tilt switch means and said motor for resetting said exercise device to operational status after said tilt switch means has been activated;



a pedal means pivotally mounted at the outer ends of said crank assembly means having a foot restraint means for holding an individual's foot in place while using said exercise device.

4,928,674

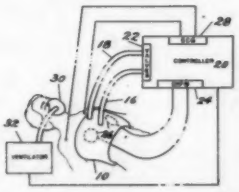
CARDIOPULMONARY RESUSCITATION AND ASSISTED CIRCULATION SYSTEM

Henry Halperin, Baltimore; Joshua Tsitlik, Reisterstown; Myron Weisfeldt, Baltimore, and Mark Gelfand, Reisterstown, all of Md., assignors to The Johns Hopkins University, Baltimore, Md.

Filed Nov. 21, 1988, Ser. No. 273,810

Int. Cl.[5] A61H *31/00*

U.S. Cl. 128—30.2 **30 Claims**



1. A system for generating cyclic fluctuations in intrathoracic pressure for use in cardiopulmonary resuscitation of a patient comprising:

a first inflatable bladder means;

means for cyclically inflating and deflating said inflatable bladder means;

means for mounting said inflatable bladder means adjacent the chest wall of a patient so that cyclic inflation of deflation of the bladder means will produce pressure on the chest wall thus generating changes in intrathoracic pressure;

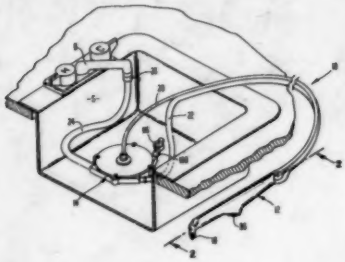
means for (a) urging said inflatable bladder means against the chest wall of the patient to generate an initial pressure on the chest wall, (b) cyclically inflating said bladder means to generate large changes in intrathoracic pressure and, (c) periodically interrupting said urging to release said initial pressure and allow the chest to expand for adequate ventilation of the patient.

4,928,675

DENTAL TREATMENT APPARATUS

Thomas F. Thornton, 43 Contentment Island Rd., Darien, Conn. 06820

Division of Ser. No. 112,278, Oct. 26, 1987, Pat. No. 4,808,109.
This application Nov. 22, 1988, Ser. No. 274,568
Int. Cl.[5] A61H 9/00
U.S. Cl. 128—66 2 Claims



2. An apparatus for removing plaque from dental surfaces by simultaneous brushing and treating with hot water at least 40° C. comprising:

(a) means for supplying hot water,

(b) toothbrush means having an elongate handle and a brush,

(c) a flexible hose connecting the means for supplying hot water to the toothbrush means and extending along the handle to the brush to dispense hot water adjacent the brush, and

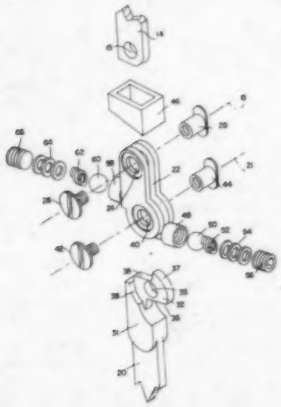
(d) a hot-water-temperature-reading thermometer mounted on the apparatus and exposed to the hot water to measure the temperature of the water delivered to the brush.

4,928,676

KNEE BRACE WITH FLEXIBLE SECONDARY JOINT

Timothy Pansiera, 1050 N.W. First Ave., Boca Raton, Fla. 33432

Filed Feb. 27, 1989, Ser. No. 315,760
Int. Cl.[5] A61F 5/04
U.S. Cl. 128—80 F 5 Claims



1. A knee brace having a primary joint and a flexible secondary joint, the brace comprising:

(a) an upper member for the support of a lateral side of a leg above the knee thereof, said upper member having an upper end and a lower end;

(b) a lower means for the support of said lateral side of the leg below the knee thereof, said lower member having an upper end and a lower end;

(c) a bi-axial element having a primary axis and a second axis, said lower end of said upper member being rotationally coupled to said primary axis, said upper end of said lower member being rotationally coupled to said secondary axis;

(d) lock means for selectively locking said lower end of said upper member to said primary axis, thereby selectably overriding said rotational coupling between said upper member and said primary axis of said bi-axial element, in which actuation of said locking means operates to change the effective axis of said bi-axial element from said primary axis to said second axis; and

(e) mechanical damping means oriented in said bi-axial element and applied against said secondary axis, said damping means comprising means for angularly biasing said secondary axis relative to said primary axis in a direction of rotation anterior to said primary axis,

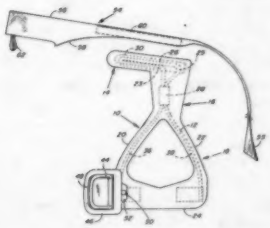
whereby said knee brace will permit a more natural flexibility of the knee and of the lower leg, both when the knee is straight and when the knee is bent as is the case during sitting.

4,928,677

HYGIENE SPLINT

Lois M. Barber, Pismo Beach, Calif., assignor to LMB Hand Rehab Products, San Luis Obispo, Calif.

Filed Feb. 13, 1989, Ser. No. 309,115
Int. Cl.[5] A61F 5/00
U.S. Cl. 128—87 R 17 Claims



1. A hygiene splint useable for a right hand or a left hand by turning the splint over comprising:

a hand grip for holding the fingers out of the palm of a user;

a ventral wrist support adapted to contact the ulnar side of a wrist and palm of a user and adapted to leave the thumb and thenar eminence substantially free from contact;

a ventral forearm support for support of said forearm;

means joining said hand grip, said ventral wrist support, and said ventral forearm support;

said means joining said hand grip, said ventral wrist support and said ventral forearm support comprising at least one wire which extends from said hand grip to said ventral wrist support and from said ventral wrist support to said ventral forearm support;

strap means for securing said splint to the hand, wrist, and forearm of a user;

a manually bendable support framework with a pliant cushioning material enclosing at least a portion of said framework; and wherein:

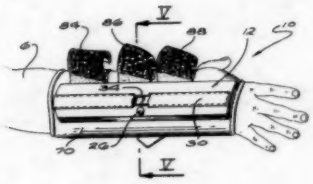
said framework is formed of a continuous unbroken length of malleable wire.

4,928,678

SOFT-GOODS TYPE, FORMABLE ORTHOPAEDIC CAST

Tracy E. Grim, Broken Arrow, Okla., assignor to Royce Medical Company, Westlake Village, Calif.

Filed Aug. 11, 1989, Ser. No. 392,836
The portion of the term of this patent subsequent to Aug. 1, 2006, has been disclaimed.
Int. Cl.[5] A61F 5/04
U.S. Cl. 128—90 28 Claims



1. An orthopaedic soft-goods type cast assembly comprising:

means including a flexible casing, for enclosing a limb or other portion of the anatomy, having opposed edges;

said casing being manufactured or initially formed or tailored specifically to fit a selected portion of the anatomy of a patient, and having an initial irregular contour or pattern which follows the irregular and unique shape of said selected portion of the anatomy;

means for holding the two opposed edges of said casing toward one-another and securing said casing onto a limb or the like adjustably to accommodate variations in swelling;

liquid or gas permeable material impregnated with an activatable, hardenable material which structurally conforms to said portion of the anatomy when activated, said liquid permeable material being mounted to and secured to conform with the configuration of said casing;

a gas and water impervious pouch for preventing premature activation of said hardenable material; and

means for activating said hardenable material to form a cast or a splint for the limb or other portion of the anatomy.

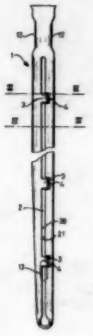
4,928,679

CENTRO-MEDULLARY NAILING ROD

Francis Chagneau, Rennes; Michel Levasseur, Cesson-Sevigne; Patrick Landanger, Foulain; Frantz Langlais, Rennes, and Jean-Jacques Rolland, Dinan, all of France, assignors to Landos Applications Orthopediques Francaises, Chaumont Cedex, France

Filed Jul. 20, 1988, Ser. No. 221,949
Claims priority, application France, Jul. 21, 1987, 8710428
Int. Cl.[5] A61F 5/04
U.S. Cl. 606—62 3 Claims

1. A centro-medullary nailing rod for treating bone fractures, said rod comprising an elongated hollow tube having a thin metal wall formed with a longitudinally extending slot having generally straight confronting edges extending from an open lower end to terminate in a blind end of said slot spaced longitudinally, down from an open upper end of said tube thereby forming a relatively short length, unslotted, annular upper end portion of said nailing rod, said wall "including locking means for preventing and substantial relative displacement between said confronting edges of said slot in a longitudinal direction, while allowing relative displacement thereof in a transverse direction, said locking means comprising a series of longitudinally spaced apart transversely extending tongues integrally formed on an edge of said slot and penetrating into cut-outs of complementary shape formed in a confronting edge



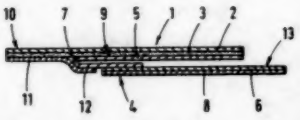
of said slot, thereby imparting an intermeshing shape to said edges of said slot.

4,928,680

ADHESIVE COATED DRESSING AND APPLICATORS THEREFOR

Barry M. Sandbank, Herts, United Kingdom, assignor to Smith & Nephew plc, United Kingdom

Filed Sep. 9, 1988, Ser. No. 242,727
Claims priority, application United Kingdom, Sep. 15, 1987, 8721659
Int. Cl.[5] A61F 13/00
U.S. Cl. 128—155 12 Claims



1. An adhesive coated thin film dressing in combination with an applicator therefor wherein the applicator comprises a pair of superposed laminar members hinged at one end, the lower member being adapted to be grasped at the end remote from the hinge and the upper member being adapted to support the dressing and being in releasable contact with a major portion of the adhesive surface thereof; and wherein a protector, in releasable contact with the remaining portion of the adhesive surface, extends beyond the hinged end of the upper member.

4,928,681

WOUND DRESSING

Richard D. Langston, Wokingham; Frances C. Webb, Maidenhead, and Simon C. McBeath, Poole, all of United Kingdom, assignors to Charcoal Cloth Limited, Berkshire, England

Filed Jun. 30, 1988, Ser. No. 213,663
Claims priority, application United Kingdom, Jul. 1, 1987, 8715421
Int. Cl.[5] A61L 15/00
U.S. Cl. 128—156 16 Claims

1. A wound dressing which comprises, in order:

a layer of a permeable material suitable for putting in contact with the wound;
a layer of a charcoal fabric;

an absorbent pad; and
one or more layers including an impermeable material which protect and substantially prevent liquid strike-through.

4,928,682

AIRCRAFT ON-BOARD OXYGEN GENERATING SYSTEMS

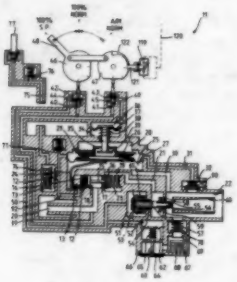
George F. Stevenson; James C. Foote, and Humphrey A. S. Hamlin, all of Somerset, England, assignors to Normalair-Garrett (Holdings) Limited, United Kingdom

Filed Oct. 3, 1988, Ser. No. 252,141

Claims priority, application United Kingdom, Oct. 14, 1987, 8724081

Int. Cl.[5] A61M *15/00*

U.S. Cl. 128—202.26 **11 Claims**



1. An on-board oxygen generating system including an aircraft aircrew breathing demand regulator comprising inlet means for receiving a supply of oxygen-enriched breathable gas from a molecular sieve oxygen generating system (MSOGS), outlet means for delivering breathable gas to an end user, demand valve means connected between said inlet means and said outlet means for controlling delivery of MSOGS oxygen-enriched breathable gas from said inlet means to said outlet means in response to breathing demands of the end user, injector means including an injector nozzle connected between said demand valve means and said outlet means and operable by said MSOGS oxygen-enriched breathable gas, injector nozzle bypass means including control means for controlling flow of MSOGS oxygen-enriched breathable gas to bypass said injector nozzle or to be entirely through said injector nozzle in passing from said demand valve means to said outlet means, ambient air inlet means including ambient air inlet control valve means for permitting ambient air to be drawn into said regulator by said injector means, and regulator mode selector switch means for controlling said injector nozzle bypass control means and said ambient air inlet control valve means, whereby in one mode of regulator operation said ambient air inlet control valve means is closed and said injector nozzle bypass means is open to permit undiluted MSOGS oxygen-enriched breathable gas to be delivered to said outlet means and in another mode of regulator operation said ambient air inlet control valve means is open and said injector nozzle bypass means is closed so that MSOGS oxygen-enriched breathable gas flows through said injector nozzle to induce ambient air to enter said regulator to mix with MSOGS oxygen-enriched breathable gas and breathable gas of diluted oxygen concentration is delivered to said outlet means.

4,928,683

RESPIRATING APPARATUS FOR PATIENTS

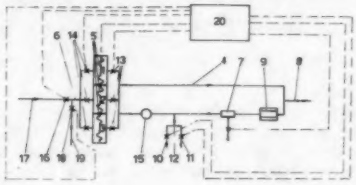
Bart Westerkamp, and Geert Van Dijk, both of Pampuslaan 90, Weesp, Netherlands

Filed Feb. 2, 1988, Ser. No. 151,675

Claims priority, application Netherlands, Feb. 17, 1987, 8700389

Int. Cl.[5] A61M *15/00*

U.S. Cl. 128—203.12 **5 Claims**



1. An anesthesia respirating apparatus for patients comprising a closed line system that is provided with a first pump by means of which respiratory gas may be circulated in said closed line system and with a second pump by means of which the respiratory gas in said closed line system may be alternately compressed and decompressed to make the patient respire in accordance with a certain respiratory pattern, the closed line system being provided with means for connecting said closed line system with the patient and with further connecting means for supplying the various components of the respiratory gas to said closed line system and with still further means for withdrawing carbon dioxide that has been exhaled by the patient into the closed line system, the second pump including a plurality of simultaneously operable pump chambers connected in parallel with one another, each pump chamber having a flexible membrane which extends completely across said chamber and which separates said chamber into a primary and a secondary portion, the secondary portion of each pump chamber being connected to the closed line system and the primary portion of each pump chamber being connected to a supply of compressed air whose pressure may be varied to effect a pumping action of the membrane, and a plurality of externally controllable valves located respectively between said compressed air supply and the primary portions of said pump chambers and between the secondary portions of said pump chambers and said closed line system for selectively varying the number of said parallel pump chambers that are simultaneously operative to effect a pumping action at any given time thereby to control the pressure of the respiratory gas being circulated in said closed line system.

4,928,684

APPARATUS FOR ASSISTING THE SPONTANEOUS RESPIRATION OF A PATIENT

Wilhelm Breitenfelder, Friedberg, and Fritz Trenkner, Taunus, both of Fed. Rep. of Germany, assignors to Salvia-Werk Gesellschaft zur Herstellung chemischer and pharmazeutischer Erzeuginisse mbH, Saar, Fed. Rep. of Germany

Filed May 22, 1989, Ser. No. 354,610

Claims priority, application Fed. Rep. of Germany, May 27, 1988, 3817985

Int. Cl.[5] A61M *16/00*

U.S. Cl. 128—204.21 **10 Claims**

1. An apparatus for assisting the spontaneous breathing of a patient, comprising:

a respiratory-gas mixing unit (1) for mixing air and oxygen in a desired ratio in order to supply the patient with a respiratory gas of an adjustable oxygen concentration, said mixing unit including,

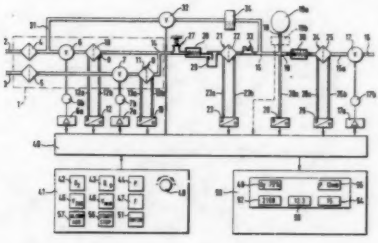
(a) an air conduit (2) having an air flow sensor for generating an electrical air flow signal corresponding to the air flow, and an electrically controlled air valve (6) for adjusting the air flow,

(b) an oxygen conduit (3) having an oxygen sensor (9) for generating an electrical oxygen flow signal corresponding to the oxygen flow, and an oxygen valve (7) for adjusting the oxygen flow, and

(c) a mixing area (14) combining said air and oxygen conduits;

an outlet (16) having

an electrically controlled outlet valve (17) for adjusting the gas flow through said outlet (16)



a gas duct (15) connected to said respiratory-gas mixing unit (1) and extending to said outlet (16);

a patient line (19) branching off from said gas duct (15) for providing an air/oxygen mixture to the patient;

a respiratory-gas pressure sensor (20) in connection with said patient line for generating an electrical signal corresponding to the pressure of the respiratory-gas in the patient line; and

an electronic control unit operatively connected to said air flow sensor (8), said oxygen flow sensor (9), said respiratory-gas pressure sensor (20), said air valve (6), said oxygen valve (7), and said outlet valve (17), such that signals from said sensor are input to said control unit as variables, and said control unit outputs control signals to said valves in response thereto.

4,928,685

CLOSED-CIRCUIT POSITIVE PRESSURE BREATHING APPARATUS WITH PNEUMATICALLY OPERATED STORAGE CHAMBER

Robert E. Gray, Glen Mills, Pa., assignor to Cairns & Brother Inc., Clifton, N.J.

Filed Oct. 5, 1988, Ser. No. 253,710

Int. Cl.[5] A61M *16/00*

U.S. Cl. 128—204.24 **9 Claims**

1. A rebreathing apparatus for use by a wearer having a respiratory system, which comprises:

an inhale/exhale breathing conduit;

an exhaust gas scrubber means for removing carbon dioxide from an exhaled gaseous stream and having an inlet connected to said inhale/exhale breathing conduit;

a breathing storage chamber including means for varying volume of said breathing storage chamber;

a conduit means for providing fluid flow between said exhaust gas scrubber means and said breathing storage chamber;

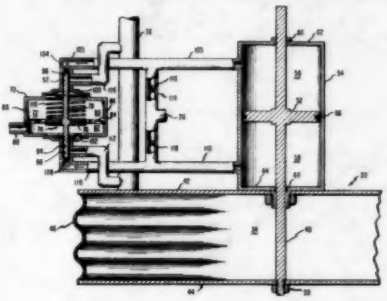
a conduit means for providing fluid flow between said breathing storage chamber and said inhale/exhale breathing conduit;

a breathing gas supply tank;

a pressure reducer valve having an inlet and an outlet;

a conduit means for providing fluid flow between said breathing gas supply tank and said inlet of said pressure reducer valve;

a pressure sensor means having a housing in fluid flow communication with said outlet of said pressure reducer valve, said pressure sensor means having a piston defining at least two fluidically separate chambers within said housing, one of said chambers being in constant fluid communication with ambient pressure and the other of said chambers being in fluid communication with said inhale/exhale



breathing conduit, said pressure sensor means including means within said housing for reciprocally actuating said piston in response to a change of pressure within said other of said chambers due to a change of pressure within said inhale/exhale breathing conduit, said pressure sensor means having valve chambers in alternating fluid flow communication with said means for varying volume of said breathing storage chamber whereby pressure of inhalation/exhalation drives said means for varying pressure of said breathing storage chamber to increase/decrease pressure, respectively, of said breathing storage chamber.

4,928,686

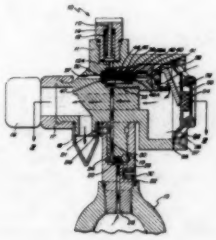
LIGHTWEIGHT BREATHING DEVICE

Guy S. Nelepka, 2327 N. Tustin Ave., Newport Beach, Calif. 92660

Filed Jan. 3, 1989, Ser. No. 293,071

Int. Cl.[5] A62B *9/02*

U.S. Cl. 128—205.24 **8 Claims**



1. An air breathing device, comprising

a. a main body including a fill port for supplying air to an air supply tank mounted on the breathing device;

b. a rotatable cylinder stem defining a first orifice bore, the cylinder stem being mounted on the breathing device and attached to the air supply tank, the first orifice bore being connected to the air supply tank;

c. an on-off valve mounted on the cylinder stem and defining

a second orifice bore, the first and second orifice bores being adapted to form an air connection upon sufficient rotation of the cylinder stem, thereby turning on and admitting air from the air supply tank to the device;

d. an air regulator housing mounted within the main body and connecting from the second orifice bore to a poppet bore cavity;

e. an elongate, spring loaded poppet means defining a longitudinal, axial bore, one end of the poppet means seating into an atmospheric bore, and an opposed end of the poppet means, including a poppet head, seating into and sealing the poppet bore cavity, and a poppet stem mounted and secured within the longitudinal, axial bore of the poppet;

f. a body portion mounted in the on-off valve and providing an air connection between the valve and the poppet means of the air regulator housing;

g. a breathing mouthpiece and exhaust port mounted on the air breathing device, the breathing mouthpiece being air connected through the body portion to the air regulator, housing and the poppet bore cavity, and the exhaust port being air connected to the body portion; and,

h. a lever adapted to actuate the stem of the poppet means the poppet stem being connected to the lever through a poppet stem cavity contiguous with the poppet bore cavity and secured in the poppet stem cavity by a shoulder formed on the poppet stem; whereby: i. when the on-off valve is turned on, and a user inhales on the mouthpiece, sufficient suction is produced to unseat the poppet from the poppet bore cavity and admit air to the user from the air supply tank and through the connected first orifice bore, and then through the body portion; ii. when the user exhales on the mouthpiece, the poppet closes and exhaust air passes through the body portion to the exhaust port; and, iii. when the lever is pressed, the poppet will be unseated and release or blow out water and moisture through the body portion and exhaust port.

4,928,687

CO_2 DIAGNOSTIC MONITOR

Samsun Lampotang; Dietrich Gravenstein; Joachim S. Gravenstein; Nikolaus Gravenstein, and Michael J. Banner, all of Gainesville, Fla., assignors to The University of Florida, Gainesville, Fla.

Filed Oct. 11, 1988, Ser. No. 255,400
Int. Cl.[5] A61M *16/00*
U.S. Cl. 128—207.14 **30 Claims**

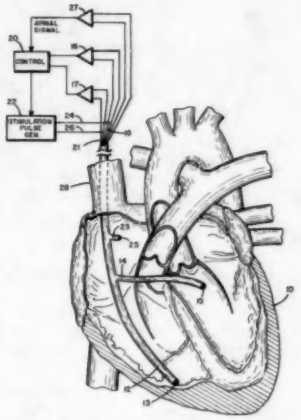
1. A self-contained diagnostic monitor for screening the CO_2 content of a gas exiting a patient during endotracheal or esophageal intubation comprising: (1) a reservoir containing at least one portion of a composition having an initial pH in solution above about 3.8 and which substantially changes color in solution in response to exposure to CO_2, said reservoir having an opening adapted for communication only with said gas exiting and entering said patient during endotracheal or esophageal intubation; and (2) a semipermeable membrane which is permeable to CO_2, said membrane separating said at least one composition portion from said exiting and entering gases, and wherein said reservoir contains a plurality of composition portions having initial pH is solution above about 3.8 and which substantially change color in solution in response to exposure to CO_2, and further comprising a plurality of semi-permeable membranes having differing thicknesses and/or CO_2 permeabilities and/or surface areas, each semi-permeable membrane separating a corresponding composition portion from said exiting and said entering gas, and each one of said plurality of composition portions separated from every other composition portion by at least one semi-permeable membrane, and each of said plurality of composition portions requiring a different time of exposure to CO_2 to effect said change in pH thereby causing said color change.

4,928,688

METHOD AND APPARATUS FOR TREATING HEMODYNAMIC DISFUNCTION

Morton M. Mower, Lutherville, Md., assignor to Mieczyslaw Mirowski, Owings Mills, Md.

Filed Jan. 23, 1989, Ser. No. 299,895
Int. Cl.[5] A61N *1/00*
U.S. Cl. 128—419 PG **14 Claims**



1. A method for improving the hemodynamic efficiency of a sick heart comprising the steps of:

(a) detecting respective cardiac signals originating in the left and right ventricles of the heart;

(b) analyzing said cardiac signals and the absence thereof in an electronic control circuit; and

(c) providing electrical pulses from a stimulating circuit controlled by said control circuit to one, the other or both ventricles as required for effecting substantially simultaneous contraction of both ventricles, said step of analyzing including providing a control signal from said control circuit to said stimulating circuit for producing an electrical stimulating pulse to one or both ventricles in response to the absence of a detected cardiac signal from one or both ventricles within a time interval which is a small fraction of the pulse width of a detected cardiac signal.

4,928,689

RATE ADAPTIVE CARDIAC PACER SYSTEM HAVING LIVING CELL TISSUE FOR SENSING PHYSIOLOGIC DEMAND

Robert G. Hauser, Long Lake, Minn., assignor to Cardiac Pacemakers, Inc., St. Paul, Minn.

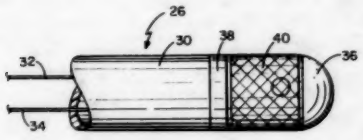
Filed May 15, 1989, Ser. No. 351,482
Int. Cl.[5] A61N *1/00*
U.S. Cl. 128—419 P **11 Claims**

1. An implantable apparatus for pacing the heart in accordance with a sensed physiologic demand comprising:

(a) adjustable rate demand pacer for implantation in a human body, including means for sensing naturally occurring ventricular depolarization signals originating within the

heat tissue and coordinating the application of electrical stimulation signals to said heart tissue with said naturally occurring ventricular depolarization signals; and

(b) a pacing lead for implantation in said human body, at least a portion of said lead being disposed within the heart, said lead being electrically coupled to said adjustable rate demand pacer and having a stimulating electrode, a sensing electrode and a substrate supporting iving sinus, node, cell tissue, said sensing electrode detecting through said substrate depolarization of said sinus node cell tissue and delivering a rate control signal to said adjustable rate demand pacer for controlling the rate at which said electrical stimulation signals are delivered to said stimulating electrode.

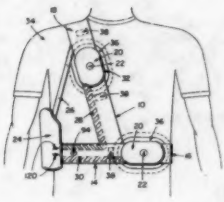


4,928,690

PORTABLE DEVICE FOR SENSING CARDIAC FUNCTION AND AUTOMATICALLY DELIVERING ELECTRICAL THERAPY

Marlin S. Heilman, Sarver; Arlan J. Brandt, Gibsonia; Larry D. Bowling, and Joseph F. Russial, both of Pittsburgh, all of Pa., assignors to Lifecor, Inc., Pittsburgh, Pa.

Filed Apr. 25, 1988, Ser. No. 185,781
Int. Cl.[5] A61N *1/00*
U.S. Cl. 128—421 **51 Claims**



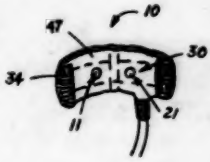
1. A patient-worn device for automatically delivering electrical therapy to the heart upon the occurrence of a treatable heart arrhythmia, the device comprising: monitoring means for continuously sensing the patient's heart condition, skin-contacting treatment electrode means having a surface adapted for contact with the patient's skin, a source of electrical energy for supplying electrical pulses to the electrode means, discrimination means for receiving signals from the monitoring means and determining the presence of a treatable heart arrhythmia, impedance reducing means associated with the electrode means for actuation by the discrimination means responsive to the detection of a treatable heart arrhythmia for automatically reducing the impedance to electrical current flow at an interface between said surface of the electrode means and the patient's skin, and switching means actuated by the discrimination means responsive to the detection of a treatable arrhythmia for connecting the source of electrical energy to the electrode means thereby applying appropriate electrical pulses to the heart.

4,928,691

LINGUAL OXIMETER PROBE

Susan C. Nicolson, and David R. Jobes, both of Cherry Hill, N.J., assignors to Nellcor Incorporated, Hayward, Calif.

Filed Oct. 8, 1987, Ser. No. 106,608
Int. Cl.[5] A61B *6/00, 5/02*
U.S. Cl. 128—633 **8 Claims**



1. A non-invasive, electro-optical sensor probe for attachment to a patient for use in measuring light extinction during transillumination of a portion of blood-perfused tissue of the patient's body part, comprising:

a light source for directing light through the tissue portion to be transilluminated;

a photosensor for receiving light directed through the tissue portion transilluminated by the light source; and

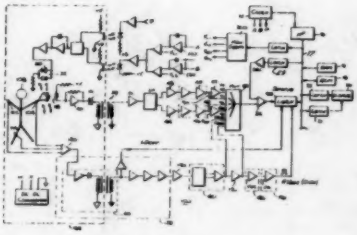
malleable, flexible, non-resilient, shape retentive attachment means for securing the light source and the photosensor to a cutaneous layer of the tissue portion such that the probe is held in conformance with said tissue portion, wherein said attachment means can be shaped to the body part being transilluminated.

4,928,692

METHOD AND APPARATUS FOR DETECTING OPTICAL PULSES

David E. Goodman, 454 Roosevelt Way, San Francisco, Calif. 94114, and James E. Coresman, 1095 Sherman Ave., Menlo Park, Calif. 94025

Continuation of Ser. No. 742,720, Jun. 5, 1985, Pat. No. 4,802,486, which is a continuation of Ser. No. 718,525, Apr. 1, 1985, abandoned. This application Nov. 23, 1988, Ser. No. 275,727
The portion of the term of this patent subsequent to Feb. 7, 2006, has been disclaimed.
Int. Cl.[5] A61B *5/02*
U.S. Cl. 128—633 **13 Claims**



1. An improved method for photoelectrically detecting arterial pulses of a patient comprising:

detecting the blood flow, which may include arterial pulses and artifacts, at the patient's body tissue using a device that calculates blood constituents from the detected blood flow;

detecting the occurrence of a selected portion of the pa-

tient's EKG waveform as the occurrence of the heartbeat of the patient;

correlating the occurrence of the heartbeat with the detection of pulses by the blood constituent calculating device; and

determining whether or not a detected pulse is likely to be a detected arterial pulse by using the determined correlation and a detected heartbeat.

4,928,693

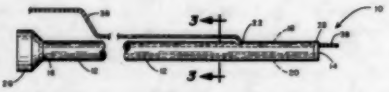
PRESSURE MONITOR CATHETER

Richard L. Goodin, Blaine; Mark A. Rydell, Golden Valley, and Rick L. Shockey, Eagan, all of Minn., assignors to Schneider (USA), Inc., Minneapolis, Minn.

Filed Mar. 13, 1989, Ser. No. 322,362

Int. Cl.[5] A61B *5/00*

U.S. Cl. 128—637 **3 Claims**



1. A pressure monitor catheter comprising:

an elongated flexible plastic tubular member having a distal end and a proximal end with a pressure sensing lumen extending from said proximal end to a pressure sensing port located proximate said distal end and a guidewire lumen extending from said distal end to a guidewire port extending through the side wall of said tubular member at a location a relatively short predetermined distance proximal of said distal end, and an elongated guidewire extending exterior of said tubular member with a relatively short distal end portion of said guidewire extending through said guidewire port, said guidewire lumen and out said distal end of said tubular member.

4,928,694

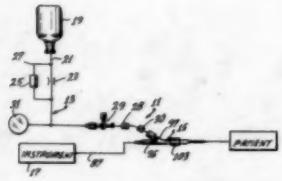
INTRAVASCULAR BLOOD PARAMETER MEASUREMENT SYSTEM

Thomas P. Maxwell, Santa Ana, Calif., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 8,937, Jan. 30, 1987, Pat. No. 4,830,013. This application Mar. 23, 1989, Ser. No. 328,041

Int. Cl.[5] A61B *5/00*

U.S. Cl. 128—637 **21 Claims**



1. A probe for sensing at least one parameter in blood comprising:

first and second optical sensors for sensing at least one parameter in blood selected from the group consisting of blood gases, pH, electrolytes, glucose, and temperature and for providing a signal in response thereto; and

elongated transmission means for transmitting the signals from the first and second sensors proximally;

said first and second sensors being carried by a distal portion of the transmission means with the first and second sensors being at different longitudinal positions along the distal portion of the transmission means; and

said transmission means and said first and second sensors being sized to be received in the cardiovascular system of a patient.

4,928,695

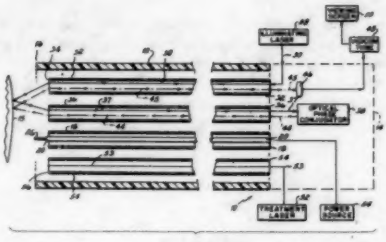
LASER DIAGNOSTIC AND TREATMENT DEVICE

Leon Goldman, The Devonshire House, 7811 Eads, No. 304, La Jolla, Calif. 92037; Ellet H. Drake, 706 Spring St., Wausau, Wis. 54401, and Steven Goldman, 4425 W. Flying Diamond Dr., Tucson, Ariz. 85704

Filed Feb. 17, 1989, Ser. No. 312,887

Int. Cl.[5] A61N *5/00*; A61B *1/06, 17/35*

U.S. Cl. 128—642 **18 Claims**



1. Apparatus for scanning organs of the body having abnormal, electrical conducting tissue, comprising:

an optical imaginary catheter tube means adapted to be inserted in vivo in proximity to the abnormal, electrical conducting tissue of a body organ;

optical phase conjugation means associated with said tube for producing a relatively undistorted image of said abnormal, electrical conducting tissue for viewing.

4,928,696

ELECTRODE-SUPPORTING HEADSET

Don J. Henderson, Danville; Robert Brady, Pescadero; Foster R. Gamble, Woodside; James V. Hardt, San Francisco; Howard Friedfeld, Palo Alto; Don Salerno, Mountain View; Tad Swanson, Menlo Park, and Maureen R. Sansing, Oakland, all of Calif., assignors to MindCenter Corporation, Palo Alto, Calif.

Filed Jul. 26, 1989, Ser. No. 385,595

Int. Cl.[5] A61B *5/04*

U.S. Cl. 128—644 **9 Claims**

1. A headset apparatus for detecting electrical signals from a head of a subject for extended periods comprising:

a tubular support member having a base end and a frontal end, said tubular support member shaped to extend from a base to a forehead of said head along a central distal contour;

a first tubular mount member rigidly attached to a right occipital side of said base end, said first tubular mount member comprising a first suspension segment, a second suspension segment and a first half of a third suspension segment, each said suspension segment comprising opposing parallel pole members separated by a space, said first suspension segment being disposed between said base end and a right vertical side pole member disposed behind a right ear position, said second suspension segment being disposed between said frontal end and a right horizontal pole member above said right ear position, and said first half of said third segment being disposed at a right forward position adjacent a right temple portion;

a second tubular mount member rigidly attached to a left occipital side of said base end, said second tubular mount member comprising a fourth suspension segment, a fifth suspension segment and a second half of said third suspension segment, each said suspension segment comprising opposing parallel pole members separated by a space, said fourth suspension segment being disposed between said base end and a left vertical side pole member disposed behind a left ear position, said fifth suspension segment being disposed between said forward end and a left horizontal pole member above said left ear position, and said second half of said third segment being disposed at a left forward position adjacent a left temple portion; and

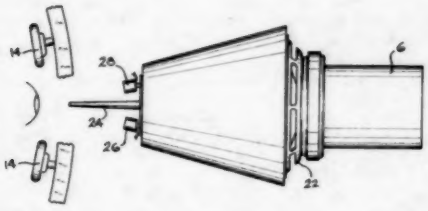
a plurality of flexible electrode supporting band means, including at least one electrode mounted to each said band means, each of said band means are for pressing said electrodes against said head at occipital, frontal and central portions of said head, each said band means having at each end means for forming a tube slidably attachable on opposing pairs of said pole members and including means for adjusting the length of said band means between said opposing pole member pairs to adjust pressure between the band means and the head.

4,928,697

NON-CONTACT HIGH FREQUENCY TONOMETER

Hsiung Hsu, Columbus, Ohio, assignor to The Ohio State University, Columbus, Ohio

Filed Sep. 28, 1988, Ser. No. 250,165
Int. Cl.[5] A61B *3/16*
U.S. Cl. 128—649 **4 Claims**



1. A tonometer for use in the non-contact measurement of intraocular pressure of an eye comprising, in combination:

support means for placing such eye in a fixed position;

means for producing a low frequency perturbating sound wave positioned proximate of such eye wherein such perturbating sound wave is directed toward such eye for causing a vibration on the surface of such eye, the intensity of such vibration being dependent upon such intraocular pressure;

means for transmitting a high frequency wave positioned proximate said perturbating wave producing means, said high frequency wave being transmitted toward such eye for reflection of such perturbated surface of such eye;

means for receiving such reflected high frequency wave and detecting any modulation in the amplitude of such high frequency wave created by such vibration of the surface of such eye;

means for creating an output signal based upon such modulation; and,

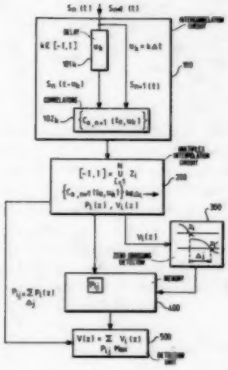
means for displaying such output signal for viewing.

4,928,698

DEVICE FOR MEASURING THE SPEED OF MOVING ORGANS AND BLOOD FLOWS BY CORRELATION

Odile M. A. Bonnefous, Nogent Sur Marne, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 12, 1989, Ser. No. 337,024
Claims priority, application France, Apr. 19, 1988, 88 05146
Int. Cl.[5] A61B *8/06*
U.S. Cl. 128—661.09 **2 Claims**



1. In an ultrasonic examination system for measuring the speed of moving organs and blood flows of the type responsive to an echographic signal representing recurrent emission with a recurrent period T comprising intercorrelation means which operates with a sampling step Δt which supplies on the basis of two successive echographic lines shifted by $k\Delta t$ ($k=-I, -I+1, \ldots, I$), $2I+1$ correlation function values and multiplex/interpolation means which supplies, on the basis of correlation function values, a signal representing an estimate of the speed and the value manifested by the corresponding correlation peak, the improvement therewith comprising:

said intercorrelation means and multiplex means including means responsive to said echographic signal applied as an input thereto for generating an output signal having first and second values respectively manifesting an estimate of (1) the speed and (2) the value of the correlation peak within each of N zones defined in the time shift interval $\{-I\Delta t, +I\Delta t\}$;

zero crossing detector means responsive to said output signal first value for generating a signal defining M segments limited by the values of the scanning depth for which the estimate of the speed passes through zero in the set of N zones;

memory means responsive to said output signal second value and to the zero crossing detector means generated signal for storing the accumulated values P_{ij} of the correlation peak corresponding to the i^{th} zone ($i=1, \ldots, N$) and to the j^{th} segment ($j=1, \ldots, M$); and

detection means responsive to the stored accumulated values P_{ij} for reconstructing the speed profile searched by retaining for each segment j the speed profile in the zone i for which P_{ij} is maximum.

4,928,699

ULTRASONIC DIAGNOSIS DEVICE

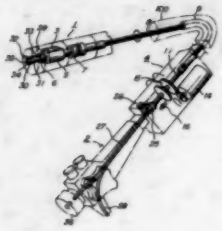
Tsuguhisa Sasai, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed May 11, 1988, Ser. No. 192,658

Claims priority, application Japan, May 18, 1987, 62-119026; May 18, 1987, 62-119028; Jul. 29, 1987, 62-187837

Int. Cl.[5] A61B 8/12

U.S. Cl. 128—662.06 **15 Claims**



1. An ultrasonic diagnosis device comprising an ultrasonic probe arranged in a front end region of an insertion portion to be inserted into a cavity, the ultrasonic probe being supported by a hollow cylindrical member which is rotatable about a center axis of the insertion portion, a drive means arranged in an external drive portion located outside of the cavity, for causing the rotation of the ultrasonic probe, a hollow power transmission means which passes through the insertion portion, for drivably connecting said hollow cylindrical member with said drive means, a hollow channel extending from an end surface of the front end region, through said hollow cylindrical member and an interior of said hollow power transmission means to a manipulation portion located outside the cavity which controls operational functions of the front end region of the insertion portion, and an image transmission means arranged within said hollow channel, for obtaining an optical image for a visual field on the front side of the device in the insertion direction of the front end region and for transmitting said optical image to the manipulation portion.

4,928,700

PULSE WAVE DETECTING APPARATUS

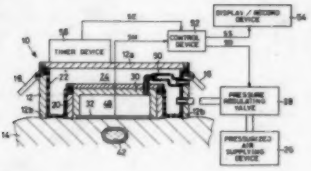
Chikao Harada, Nagoya, Japan, assignor to Colin Electronics Co., Ltd., Aichi, Japan

Filed Jan. 23, 1989, Ser. No. 299,410

Claims priority, application Japan, Jan. 28, 1988, 63-10112[U]

Int. Cl.[5] A61B 5/02

U.S. Cl. 128—672 **6 Claims**



1. A blood pressure monitoring apparatus comprising:

a pressure sensitive semiconductor element for detecting pulse wave produced from an arterial vessel of a subject, and generating a pulse wave signal representing the detected pulse wave, the semiconductor element being pressed against said arterial vessel via a body surface of the subject so as to detect the pulse wave;

a housing for accommodating said semiconductor element;

control means for monitoring blood pressure of the subject based on the pulse wave signal supplied from said semiconductor element, said housing and said control means being separate from each other, and connectable to each other; and

timer means for measuring an operation time of said semiconductor element, and generating a full-use signal when said operation time exceeds a reference value which represents that the semiconductor element has been used for a permitted period of time, said timer means being supported by said housing.

4,928,701

METHOD AND APPARATUS FOR MONITORING BLOOD PRESSURE

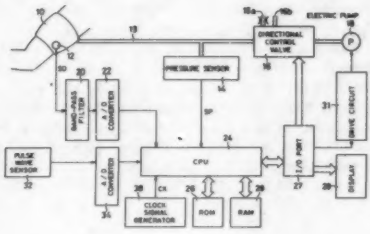
Chikao Harada, and Minoru Niwa, both of Nagoya, Japan, assignors to Colin Electronics Co., Ltd., Aichi, Japan

Filed Feb. 21, 1989, Ser. No. 312,183

Claims priority, application Japan, Feb. 23, 1988, 63-40248; Feb. 24, 1988, 63-41677

Int. Cl.[5] A61B 5/02

U.S. Cl. 128—677 **25 Claims**



1. A method of monitoring blood pressure of a subject, the method comprising the steps of:

(a) continuously detecting pulse wave which is produced from an arterial vessel of a subject synchronously with heartbeat of said subject, said pulse wave consisting of a plurality of pulses,

(b) measuring at least one blood pressure of said subject by inflating an inflatable cuff set on a body portion of said subject so as to press said body portion, and subsequently deflating said inflatable cuff,

(c) selecting one of a first pulse group consisting of at least one pulse of the pulse wave detected during a first time period immediately before beginning of the inflation of said inflatable cuff, and a second pulse group consisting of at least one pulse of the pulse wave detected during a second time period following said first time period, such that said first pulse group is selected if a magnitude of the at least one pulse of said second pulse group is smaller more than a predetermined value than a magnitude of the at least one pulse of said first pulse group, and such that said second pulse group is selected if said magnitude of said at least one pulse of said second pulse group is not smaller more than said predetermined value than said magnitude of said at least one pulse of said first pulse group,

(d) determining a relationship between blood pressure and magnitude of pulse wave, based on the measured at least one blood pressure and at least one magnitude of the at least one pulse of the selected one of said first and second pulse groups,

(e) repeating the above steps (b) to (d) and thereby updating the relationship between blood pressure and magnitude of pulse wave, and

(f) continuously determining blood pressures of said subject

based on magnitudes of the pulses of the continuously detected pulse wave, according to a currently effective one of the repetitively updated relationships.

4,928,702

DEVICE FOR PICKING OFF AND EVALUATING A PRESSURE, IN PARTICULAR A PRESSURE OF A FLUID

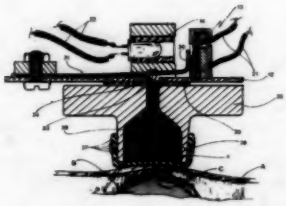
Bernard M. Cousin, 37460 Montresor, France

Division of Ser. No. 324,551, Nov. 24, 1981, abandoned. This application Apr. 20, 1987, Ser. No. 40,735

Claims priority, application France, Dec. 5, 1980, 8025815; Jun. 25, 1981, 8112457

Int. Cl.[5] A61B *5/02*

U.S. Cl. 128—678 **17 Claims**



1. A device for detecting blood pressure through the skin of a patient comprising capsule means defining a chamber having an opening, a flexible membrane extending across and closing said opening, a noncompressible liquid contained in said chamber, solid elastic means positioned opposite said opening to exert a pressure on said noncompressible liquid operating to automatically and instantaneously return said flexible membrane to its rest position when the membrane is momentarily displaced from its rest position, said solid elastic means deforming to a degree varying with the pressure transmitted into said liquid through said membrane means mounting said capsule to enable said membrane to be applied directly against the skin of a patient from which a pressure is to be detected, said membrane comprising a flexible sheet adapted and arranged to conform to the shape of and lie flat against the skin of a patient, said opening being large enough to transmit blood pressure through the skin of a patient, and said membrane into said liquid, and means to detect the degree of deformation of said solid elastic means in response to variations in pressure applied to said noncompressible liquid and to indicate the blood pressure of the patient.

4,928,703

NON-CONTACT RESPIRATION RATE AND APNEA MONITOR USING PULMONARY GAS EXCHANGE TECHNIQUE

Jacob Y. Wong, Santa Barbara, Calif., assignor to Evionics, Inc., Santa Barbara, Calif.

Filed Nov. 23, 1988, Ser. No. 275,762

Int. Cl.[5] A61B *5/08*

U.S. Cl. 128—719 **10 Claims**

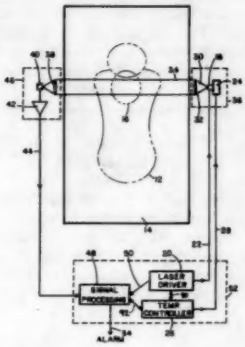
1. Apparatus for detecting apnea of a sleeping patient without the need to confine the patient under a hood or to require the patient to breathe through a tube or a mask, said apparatus comprising:

a semiconductor laser diode means for emitting substantially monochromatic coherent radiation in the 0.762 micron absorption band of oxygen;

first means located so as to collect some of the radiation emitted by said semiconductor laser diode, for forming it into a collimated beam of radiation and for directing the collimated beam to pass through a space into which the patient is exhaling;

second means located so as to intercept and collect the collimated beam after it has passed through the space into which the patient is exhaling;

third means located so as to detect the collected radiation and to produce an electrical signal representative of the quantity of radiation collected and,



fourth means electrically connected to said third means for analyzing the electrical signal to determine whether it undergoes variations of appropriate magnitude and frequency to indicate satisfactory breathing by the patient, and for producing an output signal when satisfactory breathing is not indicated.

4,928,704

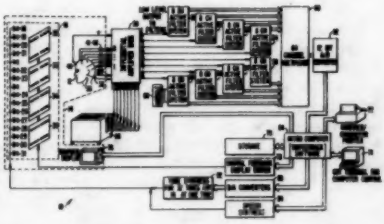
EEG BIOFEEDBACK METHOD AND SYSTEM FOR TRAINING VOLUNTARY CONTROL OF HUMAN EEG ACTIVITY

James V. Hardt, San Francisco, Calif., assignor to MindCenter Corporation, Palo Alto, Calif.

Filed Jan. 31, 1989, Ser. No. 304,979

Int. Cl.[5] A61B *5/04*

U.S. Cl. 128—732 **37 Claims**



1. A method for training a person to develop useful degrees of voluntary control of personal electroencephalographic (EEG) activity, said method comprising the steps of:

(a) placing a plurality of EEG sensors at a plurality of cortical sites on a head of said person;

(b) placing said person in an environment of controlled light and sound to control the arousal level and the distractibility of the person;

(c) sensing electric potentials from said plurality of cortical sites to obtain a plurality of channel signals in a plurality of channels;

(d) individually filtering said channel signals within predefined frequency subbands, each said predefined frequency subband having an abrupt cutoff at a low-frequency skirt,

an abrupt cutoff at a high-frequency skirt and near instantaneous propagation for processing in accordance within time constraints limited by natural neurological reactivity to obtain a resultant signal for each said channel;

(e) processing each said resultant signal to obtain objective data on brain energies as a function of channel; and

(f) presenting said objective data substantially instantaneously as feedback to said person to indicate to said person personal EEG activity at a said plurality of cortical sites within said predefined frequency spectra in order to facilitate voluntary conscious and unconscious control over said personal EEG activity.

4,928,705

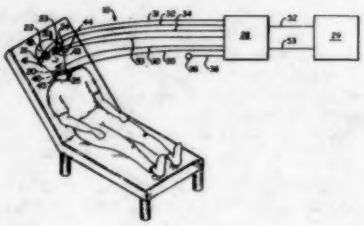
ACOUSTIC ANEURYSM DETECTOR AND ASSOCIATED METHOD

Laligam N. Sekhar; Robert J. Scalbassi; Mingui Sun, all of Pittsburgh, Pa., and Jacob F. Wasserman, Knoxville, Tenn., assignors to University of Pittsburgh of the Commonwealth System of Higher Education, Pittsburgh, Pa. and University of Tennessee Research Corporation, Knoxville, Tenn.

Filed Dec. 8, 1987, Ser. No. 130,108

Int. Cl.[5] A61B *5/02*

U.S. Cl. 128—773 **32 Claims**



1. An acoustic intracranial aneurysm detector consisting of as plurality of hydrophone sensors adapted to be in contact with a patient for receiving sound emanating from said patient and for converting the sound to be responsive electronic signals, means for adjustably positioning said sensors in contact with the patient's head,

electronic means for filtering and amplifying the responsive electric signals to create processed electrical signals, and

analysis means operatively associated with said electronic means for receiving said processed electrical signals and for simultaneously providing an output indication of the frequency and relative magnitude of said sound at each of a plurality of time intervals within a cardiac cycle of said patient, whereby the presence or absence of an aneurysm in said patient can be detected.

4,928,706

NOCTURNAL PENILE TUMESCENCE AND RIGIDITY MONITOR

Robert E. Trick, Racine, Wis., assignor to Medical Engineering Corporation, Racine, Wis.

Filed May 27, 1988, Ser. No. 200,041

Int. Cl.[5] A61B *5/10*

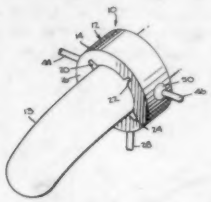
U.S. Cl. 128—774 **19 Claims**

1. A nocturnal penile tumescence and rigidity sensor comprising,

(a) a cuff member disposable on a penis, said cuff member having a substantially rigid support shell,

(b) a flexible membrane adjoined to said shell portion to define a chamber within said cuff for holding fluid, said chamber being adapted to hold selected predetermined amounts of fluid respectively correlatable with a condition of penile flaccidity and a condition of penile tumescence to permit a detection of the conditions of penile flaccidity and penile tumescence,

(c) fluid inlet and outlet means joined to said shell portion and communicable with said chamber to permit flow of said fluid into said chamber and out of said chamber in response to conditions of penile flaccidity and penile tumescence, and



(d) rigidity sensing means joined to said shell and including projectable means in said chamber for projection against said penis through said membrane to enable the rigidity of said penis to be measured as a function of pressure data detected as a result of pressure between the projectable means and the penis.

4,928,707

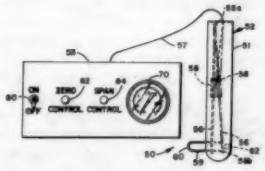
ELECTRONIC PRESSURE ALGOMETER APPARATUS

Eric L. Schiffman; James R. Fricton, both of Minneapolis, and Lawrence M. Espy, Edin, all of Minn., assignors to Regents of the University of Minnesota, St. Paul, Minn.

Continuation-in-part of Ser. No. 26,625, Mar. 17, 1987, Pat. No. 4,768,521. This application Sep. 2, 1988, Ser. No. 241,112

Int. Cl.[5] A61B *5/10*

U.S. Cl. 128—774 **21 Claims**



1. A pressure algometer apparatus, comprising:

pressure sensitive means sensing pressure applied to a localized site on a patient's body, the pressure sensitive means including transducer means having a muscle engaging surface of constant geometry for providing an electrical output signal indicative of the pressure sensed;

pressure responsive means electrically interconnected to the pressure sensitive means for receiving the electrical output signal from the pressure sensitive means, the pressure responsive means including readout means for indicating the pressure sensed by the pressure sensitive means;

coupling means for electrical interconnection of the pressure algometer apparatus to source of electrical energy; and

flexible structure means for electrically and flexibly interconnecting the pressure sensitive means to the pressure responsive means whereby the pressure sensitive means can be manipulated independently of the pressure responsive means, the pressure responsive means including supporting bridge electronics having a plurality of resistors cooperating with the pressure sensitive means to provide a bridge function, a trim resistor being further provided in the pressure responsive means so as to enable balancing of the bridge electronics when in a neutral or unstressed state.

4,928,708

REPRODUCING HUMAN POSTURE

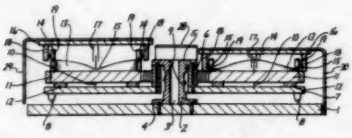
Ulrich M. Landwehr, Bahnhofstrasse 8, D-3000 Hannover, and Guenter Rackwitz, Berliner Allee 9, D-3162 Uetze/Dolbergen, both of Fed. Rep. of Germany

Filed Apr. 27, 1988, Ser. No. 186,621

Claims priority, application Fed. Rep. of Germany, Apr. 27, 1987, 3714015

Int. Cl.[5] A61B 5/10

U.S. Cl. 128—774 16 Claims



1. Apparatus for reproducibly ascertaining the posture of a free-standing human being, including a base plate connected to a central bending post; and a stand plate connected to the central post, and being provided for exerting tension upon the central post, there being strain gauges connected to the central post, the improvement comprising:

a pair of foot plates; and

means connected to the stand plate, for elevationally adjustably mounting each of the foot plates to the stand plate.

4,928,709

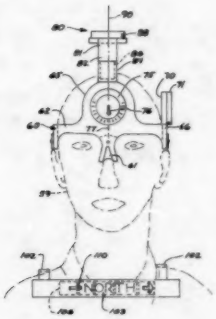
CERVICAL RANGE OF MOTION MEASURING DEVICE

John D. Allison, Shoreview, and Gordon Hanson, Roseville, both of Minn., assignors to Regents of the University of Minnesota, Minneapolis and Performance Attainment Associates, Inc., Roseville, both of, Minn., a part interest

Filed Apr. 27, 1988, Ser. No. 186,795

Int. Cl.[5] A61B 5/10

U.S. Cl. 128—782 22 Claims



1. An apparatus for measuring the range of cervical motion about at least two axes of rotation including:

a frame for detachably mounting the apparatus to a human head, said frame having a nose pad adapted to be supported on the bridge of the nose as a reference location and as a support for the frame, and temple pieces adapted to be positioned on opposite sides of a head and to rest on the top exterior of each ear for supporting and stabilizing the frame on the head of a wearer;

first angle meter means mounted on said frame for determining changes in angles about a first axis;

second magnetic type angle meter means adapted to be supported relative to the frame for determination of changes in angles of rotation about a second upright axis substantially perpendicular to the first axis and relative to a magnetic pole;

means mounted on the frame for mounting the second magnetic type angle meter means in a position adapted to overlie the head of a subject wearing the frame adjacent the axis of cervical rotation of such subject and without acting as a support for the frame; and

a magnetic field creating device means adapted to be mounted on such subject at a location spaced from the second magnetic type angle meter means, said magnetic field creating device means creating a magnetic field having a north magnetic pole for controlling orientation of the needle of the second magnetic type angle meter means.

4,928,710

BREATHING MOUTHPIECE FOR A SNORKEL

Steven M. Campbell, Laguna Beach, Calif., assignor to U.S. Divers Company, Inc., Santa Ana, Calif.

Continuation-in-part of Ser. No. 106,388, Oct. 9, 1987, Pat. No. 4,862,903. This application Oct. 11, 1988, Ser. No. 255,595

The portion of the term of this patent subsequent to Sep. 5, 2006, has been disclaimed.

Int. Cl.[5] A61F 5/56

U.S. Cl. 128—861 19 Claims

1. A mouthpiece for a snorkel wherein said snorkel has a breathing tube for conduction of breathing gas thereinto, a purge valve connected to said breathing tube for purging liquid from said breathing tube and means associated with said breathing tube for connection to said mouthpiece, said mouthpiece comprising:

conduit means adapted for connection to a breathing tube of a snorkel so that air carried through said breathing tube can pass in through said conduit means as well as exhaust from a user's mouth out through said conduit means;

a mouthpiece portion extending from said conduit means, said mouthpiece portion having a curved upper lip flange adapted generally for conforming to the interior region of a user's mouth between the upper teeth and the user's upper lips and a curved lower lip flange adapted generally for conforming to the interior region of a user's mouth between the user's lower teeth and the inner lower lips respectively;

said upper lip flange and said lower lip flange being joined to each other in a region intermediate between them;

each said upper lip flange and said lower lip flange including a frontal portion substantially coextensive with said conduit means and two opposed lateral portions extending from said frontal portion;

an upper interior web joined to and extending from said region intermediate between said upper and lower lip flanges, and being anatomically shaped for contact with at least part of the inside surfaces of at least the frontal upper teeth of a user and for extension at least partly in contact with a user's palate;

a lower web joined to and extending from the region inter-

mediate between said upper and said lower lip flanges, said lower web being anatomically shaped for contact with at least a portion of the inside surfaces of the lower teeth of a user and for extension at least partly in contact with a user's interior lower jaw portion; and,

each said upper web and said lower web including a frontal portion substantially coextensive with said conduit means and two opposed lateral portions extending from said frontal portion.

4,928,711

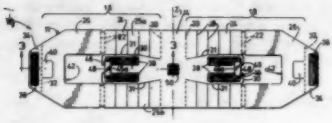
HEAD IMMOBILIZER AND METHOD FOR IMMOBILIZING

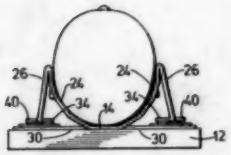
Gary R. Williams, 943 Daisy Ave., Carlsbad, Calif. 92009

Filed Nov. 29, 1989, Ser. No. 443,563

Int. Cl.[5] A61F *5/04*; A61G *1/00*; A47C *21/08*

U.S. Cl. 128—869 **23 Claims**





1. A head immobilizer of the type which can be attached to a support backboard, said immobilizer comprising:

a base;

a pair of laterally extending side panels, each side panel further comprising an inner panel and an outer panel, said inner panel having means for conforming appropriately to a shape necessary to snugly support a head to be immobilized, said inner panel further comprising an opening which effectively divides a portion of said inner panel into a pair of spaced inner support members, said outer panel having inner and outer edges and being hingedly attached adjacent its inner edge to said inner panel and foldable relative to said inner panel to provide a substantially rigid brace for securing said inner panel in a desired immobilizing position, said outer panel comprising means for providing substantial access to said opening when said inner panel is braced in a desired immobilizing position; and

means for securing said outer panel in a bracing position to support said inner panel in a desired immobilizing position, said securing means further comprising an attachment panel hingedly attached adjacent said outer edge of said outer panel and means for attaching said attachment panel adjacent said base.

4,928,712

INTRAVENOUS BOARDS

William D. Mele, 65 Park Terrace, Mill Valley, Calif. 94941

Filed Nov. 29, 1988, Ser. No. 277,650

Int. Cl.[5] A61M *5/00*

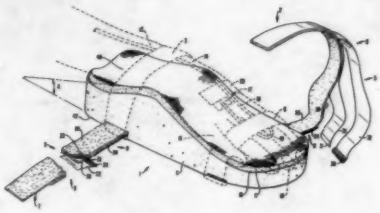
U.S. Cl. 128—877 **10 Claims**

1. A board for attaching an intravenous tube to a patient including:

a rigid base forming an arm board;

at least two straps affixed to the base by a first layer of strongly adhering adhesive, the straps having interlocking hook and loop material for securing the straps about the base;

a second layer of tape adhesive material on a surface of each strap for attaching the tube to the straps;



a plastic flap covering the second tape adhesive layer of each strap;

loop material on one end of each of the plastic flaps;

a removeable paper strip between the second tape adhesive layer and the flap;

a bottom surface of the base; and

an L-shaped leg on at least one strap on the bottom surface of the base.

4,928,713

CIGARETTE MAKING MACHINES

Hugh M. Arthur, Bucks, England, assignor to Molins PLC, Milton Keynes, England

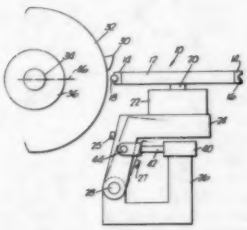
PCT No. PCT/GB86/00785, § 371 Date Aug. 20, 1987, § 102(e) Date Aug. 20, 1987, PCT Pub. No. WO87/03787, PCT Pub. Date Jul. 2, 1987

PCT Filed Dec. 19, 1986, Ser. No. 94,727

Claims priority, application United Kingdom, Dec. 20, 1985, 8531506

Int. Cl.[5] A24C *5/28, 5/31*

U.S. Cl. 131—84.1 **8 Claims**

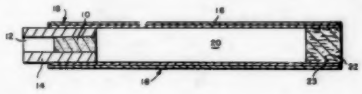


1. A rod-making machine of the cigarette industry including two cyclically movable devices which are arranged to co-operate during use, comprising separate drives for the two devices, means for electronically synchronising the two drives during normal operation, and means for displacing one of the devices from the other until the drives have been brought into synchronisation.

4,928,714
SMOKING ARTICLE WITH EMBEDDED SUBSTRATE

Michael D. Shannon, Winston-Salem, N.C., assignor to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Apr. 15, 1985, Ser. No. 723,382
Int. Cl.[5] A24D 1/18, 1/00, 1/02
U.S. Cl. 131—359 28 Claims



1. A smoking article comprising:
(a) a carbonaceous fuel element having a cavity therein; and
(b) a physically separate aerosol generating means including an aerosol forming material,
the aerosol generating means being at least partially embedded within the cavity in said fuel element.

4,928,715
CIGARETTE

Edgar Mentzel, Quickborn, and Ferdinand Meixner, Gaggenau, both of Fed. Rep. of Germany, assignors to H. F. & Ph. F. Reemtsma GmbH & Co. and Schoeller & Hoesch GmbH, both of, Fed. Rep. of Germany

Filed Jan. 25, 1989, Ser. No. 301,112
Int. Cl.[5] A74B 15/28
U.S. Cl. 131—365 11 Claims

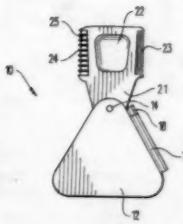
1. A cigarette having less side stream smoke and a decreased smouldering rate for a constant average number of puffs, said cigarette having a tobacco core that is enveloped by a cigarette paper wrapping, which has areas with higher and lower air permeability in the form of patterned zones, comprising a cigarette paper adjusted from an initial air permeability of 10 to 250 P, determined as the air quantity in cubic centimeters per minute per square centimeter and per kilopascal to an average total air permeability of 85 to 20% of the initial value, by batonneing patterned zones on said paper.

11. The cigarette according to claim 1 wherein the cigarette paper is batonned on both sides.

4,928,716
PORTABLE HAIR TRIMMING DEVICE

Freddie W. Greene, 15 Brinton Ave., Trenton, N.J. 08618

Filed Aug. 21, 1989, Ser. No. 396,064
Int. Cl.[5] A45D 7/02
U.S. Cl. 132—212 13 Claims

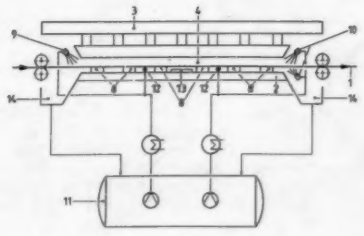


1. A portable hair trimming device, comprising:
a housing having a pair of opposite faces separated by a hollow interior portion and connected by a plurality of side walls;
an open slotted portion formed in one of said side walls of said housing;
a trimming implement having one end pivotally mounted on said housing, said trimming implement mounted for movement into and out of said hollow interior poriton;
a moustache combe formed on a first side edge of said trimming implement;
a trimming razor on a second side edge of said trimming implement, said trimming razor including:
a plurality of laterally extending, longitudinally spaced comb-like projections on said trimming implement;
said projections having aligned slot;
a double-edged razor blade frictionally engaged in said slots and extending between said projections;
a pair of parallel axially extending bores in said razor blade;
a laterally extending mounting tab on said trimming implement and in abutment with an inner end wall of said razor blade;
an aperture formed through said tab in axial alignment with one of said parallel axial bores in said razor blade; and
a retaining pin removably received through said aligned mounting tab aperture and said axial razor blade bore securing said razor blade in a reversible manner in said trimming implement.

4,928,717
EQUIPMENT FOR SURFACE TREATMENT OF CONTINUOUSLY, RUNNING STRIPS PARTICULARLY PICKLING EQUIPMENT

Werner Osarek, Bochum; Franz G. Pempera, Neuwied, and Dieter Schonert, Bochum, all of Fed. Rep. of Germany, assignors to Mannesmann AG, Duesseldorf, Fed. Rep. of Germany

PCT No. PCT/DE87/00393, § 371 Date Jun. 29, 1988, § 102(e) Date Jun. 29, 1988, PCT Pub. No. WO88/01657, PCT Pub. Date Mar. 10, 1988
PCT Filed Aug. 28, 1987, Ser. No. 246,297
Claims priority, application Fed. Rep. of Germany, Aug. 29, 1986, 3629894
Int. Cl.[5] B08B 3/02, 3/04, 7/04
U.S. Cl. 134—64 R 6 Claims



1. Equipment for surface treatment of continuously passing strips, particularly pickling equipment wherein the strip runs in longitudinal direction through a horizontally arranged closed treatment channel, said treatment channel being arranged in a container enclosing the treatment channel, and further including a lid closing the container, the container provided for receiving the treatment medium being passed into and out of the treatment channel, the channel having an inlet and an outlet, the improvement comprising said treatment channel being bounded by a bottom of the container, by two inner walls of the container arranged on the bottom and constituting treatment channel walls, as well as by an intermediate cover;
run off troughs established between the two inner walls and outer walls of the container, for receiving treatment medium;
openings provided in the treatment channel walls;
means for simultaneously spraying the treatment medium at the inlet and the outlet of the treatment channel, and through said openings;
a collection chamber, and a separately provided storage container; and

means for connecting the run-off troughs to the collection chamber through which the treatment medium can be fed to the separately provided storage container.

4,928,718

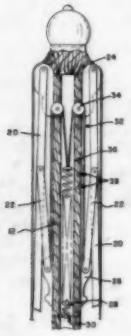
UMBRELLA

Phillip C. Apple, Mt. Pleasant Mills, Pa., assignor to American Holtzkraft, Inc., Mt. Pleasant Mills, Pa.

Continuation-in-part of Ser. No. 237,432, Aug. 8, 1988, abandoned. This application Jul. 28, 1989, Ser. No. 386,436

Int. Cl.[5] A45B *25/14, 25/16*

U.S. Cl. 135—22 **8 Claims**



1. An umbrella including a central straight post, a plurality of ribs surrounding the post and pivotally connected to the upper end of the post, a sliding hub surrounding the post between the upper and lower ends of the post, a plurality of struts surrounding the post and having post ends pivotally connected to the hub and rib ends pivotally connected to the ribs so that moving the hub upwardly along the post opens the ribs, a canopy attached to the ribs, a spring having a lower end fixed to the lower end of the post, a pulley mounted on the upper end of the post and a first strand having a first end attached to the upper end of the spring, a second end attached to the hub and a central portion extending up from the upper end of the spring, around the pulley and down to the hub, an umbrella having a collapsed position where the canopy, ribs and struts are adjacent the post, the hub is located in an elevated position on the post and the spring is extended, and an open position where the ribs, struts and canopy are opened away from the post, the hub is located in a lowered position on the post and the spring is retracted.

4,928,719

METHOD AND APPARATUS FOR PREVENTING PULSATIONS IN A FLOWING FLUID

Yuzo Inukai, and Mitsuyuki Nakayama, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 4, 1989, Ser. No. 332,915

Claims priority, application Japan, Apr. 5, 1988, 63-082172

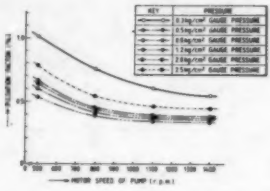
Int. Cl.[5] F15D *1/02, 1/20*

U.S. Cl. 137—1 **13 Claims**

1. A method of mechanically compensating for and thus preventing pulsations in a flowing fluid experiencing pulsations during pressure-feeding of a fluid along a path by means of a pump, said method comprising the steps of:

connecting a flexible hose in said path and passing said fluid through said flexible hose;

elastically controlling and allowing the cross-sectional area of said flexible hose to fluctuate within a range defined between a maximum cross section and a predetermined smaller cross section in accordance with pulsating experienced in pressure feeding of said fluid to thus absorb and prevent the pulsation, wherein said hose is biased by flattening into said predetermined smaller cross-sectional area



smaller than said maximum sectional area using coil springs connected to rigid plates in contact with said hose so that force of said coil springs deforms said flexible hose through said rigid plates.

4,928,720

COPOLYMERS OF ETHYLENE AND METHOXYACETIC ACID VINYL ESTER AND THEIR USE AS ADDITIVES FOR MINERAL OIL DISTILLATES

Wolfgang Payer, Wesel; Heinz D. Bühnen, and Wilhelm Zoller, both of Oberhausen, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Oberhausen, Fed. Rep. of Germany

Division of Ser. No. 372,235, Jun. 26, 1989, which is a continuation of Ser. No. 248,549, Sep. 23, 1988, abandoned. This application Jul. 13, 1989, Ser. No. 379,370

Claims priority, application Fed. Rep. of Germany, Sep. 29, 1987, 3732721

Int. Cl.[5] C08L *31/00*

U.S. Cl. 137—13 **7 Claims**

1. A method of improving the flowability of mineral oil distillates comprising the addition, to said mineral oil distillate, of a copolymer comprising 95 to 50 percent by weight ethylene and 5 to 50 percent by weight methoxyacetic acid vinyl ester having an average molecular mass (Mn) of 500 to 10,000 g mol^{-1}.

4,928,721

FUEL CONTROL VALVE CONSTRUCTION, PARTS THEREFOR AND METHODS

Samuel T. Kelly, 3506 W. 224 St., Torrance, Calif. 90505, and Jay R. Katchka, 10455 Hampshire Ct., Cypress, Calif. 90630

Division of Ser. No. 241,966, Sep. 8, 1988, which is a division of Ser. No. 87,419, Aug. 20, 1987, Pat. No. 4,787,414, which is a division of Ser. No. 938,621, Dec. 5, 1986, Pat. No. 4,729,396. This application Apr. 21, 1989, Ser. No. 341,437

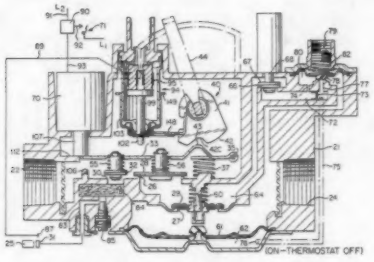
The portion of the term of this patent subsequent to Mar. 8, 2005, has been disclaimed.

Int. Cl.[5] F16K *11/18*

U.S. Cl. 137—66 **11 Claims**

1. In a fuel control valve construction comprising a housing means having an inlet means adapted to be interconnected to a main burner means, said housing means having a main valve seat for interconnecting said inlet means with said main outlet means, said housing means having a movable main valve member for opening and closing said main valve seat, said housing means having a movable lever carrying said main valve member and having a manually operable actuator means for controlling the operating positions of said lever, said lever having an intermediate cam follower portion and opposed ends disposed one each side of said cam follower portion with one end of said opposed ends being pivotally mounted to said housing means and with the other end of said opposed ends carrying said main valve member, said housing means having biasing means operatively interconnected to said lever to tend to pivot

said lever in one direction that opens said main valve member away from its said main valve seat, said actuator means having a cam means operatively associated with said cam follower portion of said lever to tend to control the pivoted position of said lever under the force of said biasing means, said actuator means having an "off" position thereof that causes said cam means to hold said lever in an "off" pivoted position thereof that maintains said main valve member in its closed condition against its said valve seat, said actuator means having an "on" position thereof that causes said cam means to tend to hold said



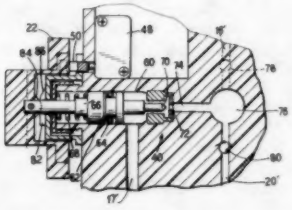
lever in an "on" pivoted position thereof that maintains said main valve member in its open condition away from its said valve seat, the improvement wherein said housing means has a thermostatically controlled means that is operatively associated with said lever and is adapted to engage and hold said lever in a position wherein said main valve member is in a closed condition against its said main valve seat when said thermostatically controlled means is in one operating condition thereof and said actuator means is in said "on" condition thereof.

4,928,722

PRESSURE RELIEF AFTER ELECTRIC SHUT-OFF OF PUMP

Warren J. Walsh, Waverly, and Bruce Kallevig, Monticello, both of Minn., assignors to Wagner Spray Tech Corporation, Minneapolis, Minn.

Division of Ser. No. 899,316, Aug. 22, 1986, Pat. No. 4,834,287.
This application Mar. 6, 1989, Ser. No. 318,971
Int. Cl.[5] F16K *11/00*
U.S. Cl. 137—881 **2 Claims**



2. A valve system comprising:

a valve body, including a fluid inlet receiving fluid under pressure, a first fluid outlet connected in continuous communication with said fluid inlet and adapted to be opened and closed, a second fluid outlet, an opening defining a valve seat between said first fluid inlet and said second fluid outlet, a bore communicating with said valve seat and said second fluid outlet, a piston slidably mounted in said bore, a valve carried by said piston for receiving said valve seat, spring means moving in said bore and urging said piston to mate said valve with said valve seat;

a shaft connected to said piston and extending out of said valve body;

a first rotatable knob connected to said shaft;

cooperable cam means on said first rotatable knob and on said valve body operable to move said shaft axially upon rotation of said first rotatable knob to a predetermined position and unseat said valve from said valve seat to place said fluid inlet and said second fluid outlet in communication and to bypass and remove pressure from said first fluid outlet; and

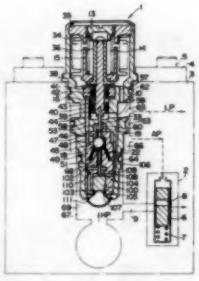
a second rotatable knob operatively interconnected with said first rotatable knob to prevent rotation of said first rotatable knob until said second rotatable knob is rotated to a selected position.

4,928,723

CAPACITY CONTROL VALVE FOR A COMPRESSOR

Tsutomu Itahana; Hideo Kanno; Tetsuo Ono; Futoru Furuta; Susumu Kobayashi; Ryosaku Akimoto, and Ryuhei Tanigaki, all of Nagoya, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 7, 1989, Ser. No. 362,478
Claims priority, application Japan, Jun. 10, 1988, 63-76433
Int. Cl.[5] G05D *16/10*
U.S. Cl. 137—116.3 **1 Claim**



1. A capacity control valve for use in a fluid compressor with a relatively high pressure HP and a relatively low pressure LP thereacross, said capacity control valve being operative to take said intermediate pressure AP, for the control of a specific amount of compressed gas to be bypassed to the suction side of said fluid compressor, as a linear function of said relatively low pressure LP using a differential pressure between said relatively high pressure HP and said relatively low pressure LP of said fluid compressor; which comprises an adjusting means adapted to adjust said intermediate pressure AP in such a manner that said relative low pressure LP is made lower as said relatively high pressure HP becomes higher, and that said relatively low pressure LP is made higher as said relatively high pressure HP becomes lower.

4,928,724

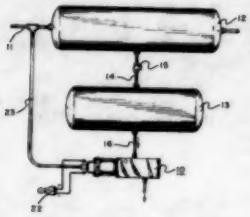
AUTOMATIC WET TANK DRAIN VALVE

Wayne R. Margerum, 15 Alden Ave., Delran, N.J. 08075

Filed Mar. 30, 1989, Ser. No. 331,595
Int. Cl.[5] B01D *5/00*
U.S. Cl. 137—204 **4 Claims**

1. Apparatus for use in an automotive air pressure system employing an air pressure tank, a wet tank for accumulating moisture within the system and drain line and manual valving for draining the moisture from the wet tank, the improvements providing for automatic draining of the wet tank upon vehicle shut down comprising:

valving means having an inlet port connected to the drain line and an outlet port vented to atmosphere and including a valve body having a piston therein, a valve piston movable within the valve bore between open and closed positions in respect to the inlet and outlet ports and a piston shut off spring urging the piston into closed position; and



fluid valve actuation means operably connected to the valving means and adapted to move the valving means to closed position during vehicle operation and to open position during vehicle shut down and wherein the fluid valve actuation means during vehicle shut down applies a counter pressure against the piston shut off spring to cause the valve piston to move to open position.

4,928,725

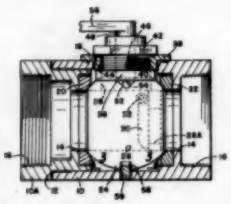
COMBINATION PLUG AND TWO-WAY CHECK VALVE

John G. Graves, 3107 Woodward Blvd., Tulsa, Okla. 74105

Filed Aug. 7, 1989, Ser. No. 390,279

Int. Cl.[5] F16K *5/06, 15/03*

U.S. Cl. 137—269.5 **8 Claims**



1. A combination plug and two-way check and plug valve comprising:

a valve body having a flow passageway therethrough and means to connect other fluid flow members thereto with such passageway in series therebetween, the body having an opening in the top thereof communicating with said passageway;

a first and a second valve seat in said body, each seat having a flow passageway therethrough, the seats being spaced apart and the flow passageways therethrough being in communication with said valve body flow passageway;

a ball member rotatably received in said body between said seats, the ball member having a flow passageway therethrough which is alignable by rotatably positioning the ball with said passageways in said seats, the ball having a top and bottom and having a top opening therein communicating with said passageway therethrough;

a clapper pivotally supported within said ball member and pivotal to a closed position blocking said passageway therethrough and to an open position opening said passageway therethrough;

a bonnet member removably closing said body top opening and having a smaller diameter opening therethrough;

stem means rotatably received in said bonnet member smaller diameter opening and removably affixed to said ball; and

means external of said valve body to rotate said stem means and thereby said ball whereby said ball may be rotated to a first position to align the said passageway therethrough with said passageways through said seats and valve body to permit the flow of fluid in one direction, said clapper blocking fluid flow in the opposite direction, and rotation to a second position to align the said passageway therethrough with said passageway through said seats and valve body to permit the flow of fluid in the opposite direction, said clapper blocking counter fluid flow, and rotated to a third position wherein said passageway therethrough is out of alignment with said passageway through said seals and body to block fluid flow in either direction through said body, and wherein in said third position , said bonnet may be removed to expose said ball and to permit access to clapper.

4,928,726

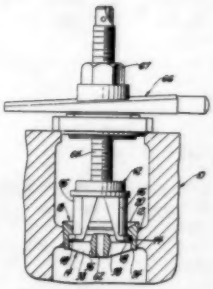
CROSSARM VALVE SEAT WITH PULLING LEDGE

Jerry E. Johnson, and Clinton C. Hoerner, Jr., both of Houston, Tex., assignors to TRW Inc., Cleveland, Ohio

Filed Jun. 29, 1988, Ser. No. 212,936

Int. Cl.[5] F16K *15/02*

U.S. Cl. 137—327 **18 Claims**

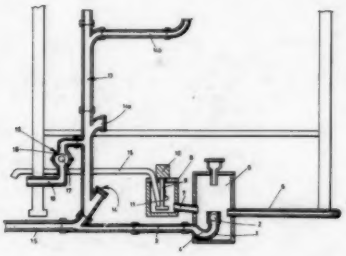


1. A valve seat assembly comprising an annular valve seat surface concentrically disposed about an axis for sealingly engaging a valve member, means for defining an internal wall extending axially from said valve seat surface and at least partially defining a flow passage through said assembly, an exterior wall adapted to engage and be supported by a support member, guide means disposed in said flow passage for guiding movement of the valve member in a direction parallel to said axis, and at least one arm extending between said guide means and said internal wall to position said guide means in said flow passage, said valve seat assembly being characterized by extraction means disposed axially between said valve seat surface and said arm for engaging a tool inserted into said flow passage to permit said assembly to be removed from the support member in response to a force exerted on said extraction means by the tool, said extraction means comprising an abutment surface facing generally away from said valve seat surface, a radially inner edge of said abutment surface being spaced axially from a radially inner edge of said valve seat surface, an annular surface extending from said radially inner edge of said valve seat surface to said radially inner edge of said abutment surface said annular surface being of constant diameter.

4,928,727
FLASH FLOOD CONTROL UNITS FOR HOUSING CONSTRUCTION

Jacques Dufresne, 6889 avenue Lamont, Montreal, Quebec, Canada (H4E 2T8)

Filed Nov. 24, 1989, Ser. No. 440,648
Int. Cl.[5] E03F 3/00
U.S. Cl. 137—360 15 Claims



1. In a drainage system for a dwelling having a basement, comprising:

at least one fixture drain connected to a main drain;

a building sewer for evacuating waste waters from said main drain to a city drain; and

a sump pump located in a water collecting reservoir in the basement of the housing for evacuating any water accumulating into said reservoir through a discharge line, said reservoir having a bottom outlet leading to said sewer; the improvements comprising:

a check valve mounted at the outlet of said reservoir to prevent back flow from the building sewer, said check valve being readily accessible from said reservoir; and

a discharge line, used to expell excess waters with said sump pump, running from said pump outside of the house.

4,928,728
GAS SHUTOFF APPARATUS

Mitsuo Namba, Machida, and Reppei Uematsu, Yokohama, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma and The High Pressure Gas Safety Institute of Japan, Tokyo, both of, Japan

Filed Feb. 9, 1989, Ser. No. 308,212
Claims priority, application Japan, Feb. 10, 1988, 63-29242; Feb. 10, 1988, 63-29243; Nov. 25, 1988, 63-298702
Int. Cl.[5] G05D 7/06
U.S. Cl. 137—486 5 Claims

1. A gas shutoff apparatus for interrupting a gas supply in a gas supply line, comprising:

flow rate measurement means for generating a flow rate signal corresponding to a flow rate of said gas in said gas supply line,

consumption state detection means for detecting a consumption state shown by said flow rate and a consumption time of the gas on the basis of said flow rate signal,

initial consumption condition setting means for setting a reference consumption condition as an initial condition,

consumption state judging means comprising means for comparing said detected consumption state with said reference consumption condition and means for generating a gas shutoff signal when said consumption state is in excess of said reference consumption condition,

a first timer for measuring a first predetermined time period,

starting signal generating means for starting operation of said first timer,

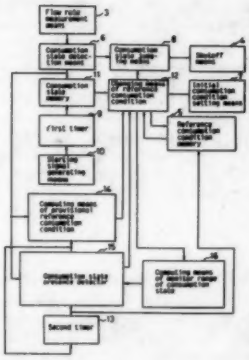
consumption state memory for storing said output consumption state by said consumption state detection means during a time period of operation of said first timer and comprising means for calculating a consumption condition on the basis of said stored consumption state,

means for changing said reference consumption condition in accordance with said calculated consumption condition,

means for computing a monitor range of said consumption condition output by said changing means,

a second timer for measuring a second predetermined time period,

means for computing a provisional reference consumption condition and setting said provisional reference consumption condition into said means for changing said reference consumption condition on the basis of an output of said consumption state detection means,



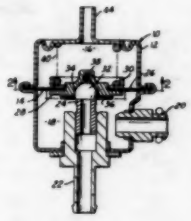
a consumption state presence detector for detecting an occurrence of said consumption state within said monitor range, for outputting a signal for starting operation of said second timer at said occurrence of said consumption state, for storing a consumption state which is present in said monitor range during operation of said second timer, and for calculating and outputting to said changing means a new reference consumption condition on the basis of said consumption state stored by said consumption state presence detector, and

shutoff means for interrupting said gas supply by reception of said shutoff signal.

4,928,729
FUEL PRESSURE REGULATOR VALVE

Michael J. Hornby, Yorktown, Va., assignor to Siemens-Bendix Automotive Electronics L.P., Troy, Mich.

Filed Apr. 11, 1989, Ser. No. 336,363
Int. Cl.[5] F16K 31/126
U.S. Cl. 137—510 2 Claims



1. In a fuel pressure regulator valve comprising a housing containing a diaphragm assembly that divides the housing into

two chambers, one chamber being a fuel chamber, and the other chamber being a control chamber, said fuel chamber having an inlet adapted to be communicated to a supply of pressurized fluid whose pressure is to be regulated and an outlet adapted to return excess fuel to a tank, said outlet having an inner end containing a valve seat with which a valve element carried by said diaphragm assembly coacts, said control chamber comprising means for establishing the pressure in said fuel chamber at which said valve element unseats from said valve seat, said valve element being a truncated sphere having a circular flat face at is truncation and having a size greater than a hemisphere, said sphere being received within a cavity in a mount carried by said diaphragm assembly such that said circular face of said sphere is presented to coact with said valve seat while said sphere is capable of swivelling within said mount, and said valve seat being flat, the improvement in retaining said sphere within said mount which comprises a single flat washer having a circular inside diameter that is less than the nominal diameter of said sphere but greater than the diameter of said flat circular face, said mount containing a recess surrounding said cavity and within which the entirety of said washer is disposed, and means comprising staking means on said mount around said recess for engaging said washer and securing said washing to said mount such that said sphere can protrude through the inside diameter of said washer to present said flat circular face to said flat valve seat while the sphere remains capable of swivelling within said mount.

4,928,730

PROPORTIONAL ELECTROMAGNETIC VALVE HAVING AMPLIFIER THEREIN

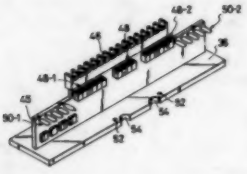
Tsuyoshi Ando, Sano; Nakayasu Hirono, Yokohama; Hirotoshi Nakao, Sano; Akio Mito, Sano; Kazuyuki Kihara, Sano; Kosuke Hatakenaka, Sano, and Hiroshi Ogawa, Sano, all of Japan, assignors to Tokyo Keiki Company, Ltd., Tokyo, Japan

Filed Jul. 19, 1988, Ser. No. 221,416

Claims priority, application Japan, Jul. 30, 1987, 62-117330[U]; Jul. 30, 1987, 62-117331[U]

Int. Cl.[5] F15B *13/044*

U.S. Cl. 137—554 **20 Claims**



1. An electromagnetic valve comprising:

a valve main body, having opposite side surfaces and a top surface, for controlling at least one of a flow rate, direction, shut off, and pressure of a fluid;

two solenoids, for controlling said valve main body, each having opposite first and second end portions and each respectively attached at said first end portion to said opposite side portions of said valve main body;

an amplifier unit having a bottom plate, said bottom plate being attached to said top surface of said valve main body, said amplifier unit further having two opposite end portions extending over said two solenoids, said two opposite end portions of said amplifier unit respectively disposed over said second end portions of said two solenoids;

a printed circuit board disposed in said amplifier unit and having amplifying circuitry for driving said two solenoids, said printed circuit board having opposite end portions respectively disposed over said two solenoids within said amplifier unit;

wherein said printed circuit board if vertically attached to said bottom plate of said amplifier unit, said bottom plate being substantially parallel said top surface of said valve main body.

4,928,731

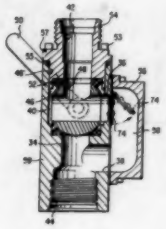
AIRCRAFT TOILET TANK FILLING VALVE ASSEMBLY

Floyd G. Koller, Dayton, Ohio, assignor to Auto-Valve, Inc., Madison Township, Ohio

Filed Jun. 22, 1989, Ser. No. 369,957

Int. Cl.[5] F16K *15/18*

U.S. Cl. 137—599 **8 Claims**



1. Aircraft toilet tank filling valve assembly comprising:

an elongated main body defining an elongated passage therethrough extending longitudinally from a first end to a second end of said main body, a first lateral passage extending laterally from said elongated passage to a bypass outer-surface side of said main body, and a second lateral passage extending laterally from said elongated passage to said bypass outer surface side of said main body, said second lateral passage being longitudinally spaced from said first lateral passage along said main body, said main body defining a smooth main-body oblong sealing facing on said bypass outer surface side surrounding said first and second lateral passages and a valve cavity at the intersection of said elongated passage and said first lateral passage for receiving a movable valve member and an actuator for allowing said movable valve member to be moved therein from outside said main body;

a one piece, elongated bypass casing defining an elongated bypass channel being open at a bypass opening on one elongated side thereof, but otherwise being closed, said bypass casing defining a bypass casing oblong sealing facing corresponding to said main-body oblong sealing facing surrounding said bypass opening, said main-body and bypass-casing oblong sealing facings being shaped and sized such that they can be placed together with a gasket therebetween to form a seal, with said elongated channel forming a passage between said first and second lateral passages;

a movable valve member mounted in said valve cavity with a valve actuator extending outside said main body, said movable valve member defining valve passages such that when it is placed in a closed valve position it does not allow flow through said straight elongated passage, but does allow flow between a first end of said elongated passage and said first lateral passage and when it is placed in an open valve position it allows flow through said elongated passage as well as communication between said elongated passage and said first lateral passage;

a one-way check valve mounted at an interface between said main body and said bypass casing for allowing fluid to flow from said first lateral passage to said elongated passage, but not in the reverse direction;

whereby said aircraft toilet tank filling valve assembly can be mounted on an aircraft with said first end of said elongated passage coupled to an aircraft toilet tank and a second end of said elongated passage being accessible for attaching a source of pressurized toilet fluid thereto for

filling said aircraft toilet tank when said movable valve member is in said open position, such that the flow of said toilet fluid to said aircraft toilet tank can be interrupted by actuating said valve actuator to move said movable valve member to said closed position, and after said toilet fluid pressure is removed from said second end of said elongated passage any toilet fluid remaining in a pipe extending between said valve assembly and said aircraft toilet tank is allowed to flow through said bypass channel out of said second end of said elongated passage.

4,928,732

FLUID FAUCET

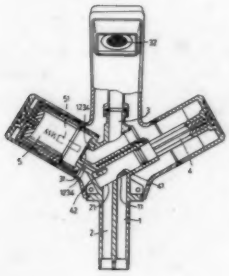
Lee-Ping Hu, Taipei Hsien, Taiwan, assignor to Hydrotek Corporation, Nan-Tou, Taiwan

Division of Ser. No. 925,498, Oct. 29, 1986, Pat. No. 4,741,363, which is a continuation of Ser. No. 784,709, Oct. 4, 1985, abandoned, which is a continuation of Ser. No. 574,670, Jan. 27, 1984, abandoned. This application Mar. 29, 1988, Ser. No. 174,782

The portion of the term of this patent subsequent to May 3, 2005, has been disclaimed.

Int. Cl.[5] F16K *11/20, 31/40*

U.S. Cl. 137—607 **3 Claims**



1. A fluid faucet comprising:

a body portion;

a first passage defined in said body portion having a first mouth and adapted for connection to a first fluid source;

a second passage defined in said body portion having a second mouth and adapted for connection to a second fluid source;

a third passage defined in said body portion having a third mouth for passing a mixed fluid therethrough;

an outlet defined in said body portion in communication with said third passage for discharging the mixed fluid;

a guarding valve means adjacent said first and second passages for selectively sealing each of said first and second mouths, said guarding valve means having a first hole defined therein which is not in communication with said first mouth when said guarding means is in a first position and fully communicates with said first mouth when said guarding means is in the second position, and a second hole defined therein which is not in communication with said second mouth when said guarding means is in the second position and fully communicates with said second mouth when said guarding means is in the first position, a chamber defined therein in communication with said first and second holes, and a third hole defined therein in communication with said chamber for permitting the mixed fluid to enter said third passage, whereby said guarding means will control the opening amounts of both of said first and second mouths to regulate fluid passed through said firs and second mouths from the first and said second fluid sources;

a handle connected to said guarding valve means for moving said guarding valve means between the first position and the second position without resulting in axial translation of said guarding valve means;

mouth engaging disk means for sealingly engaging said third mouth;

electromagnetic valve actuating means for engaging said disk means, whereby actuation of said actuating means results in displacement of the disk means to allow fluid to pass from said third mouth to said third passage and to thus be discharged from said outlet, said valve including means for sensing a body and a circuit means for actuating said electromagnetic valve actuating means when a body is sensed by said sensing means to be near said faucet and for deactuating said electromagnetic valve actuating means when the body is at a distance from said faucet, wherein said circuit means includes an infrared coupling and controlling circuit which is powered by a voltage regulator.

4,928,733

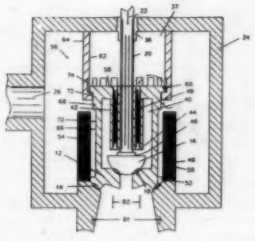
STEAM VALVE WITH VARIABLE ACTUATION FORCES

James M. Sudolnik, Lunenburg, and Stephen R. Prince, Fitchburg, both of Mass., assignors to General Electric Company, Schenectady, N.Y.

Filed Apr. 26, 1989, Ser. No. 343,236

Int. Cl.[5] F16K *1/00*

U.S. Cl. 137—630.13 **3 Claims**



1. A steam valve comprising:

a main valve;

a main valve seat;

a balance cylinder;

a balance piston in said balance cylinder;

means for transmitting a balancing force from said balance piston to said main valve;

means for permitting steam to act on said balance piston in a direction tending to open said steam valve;

said balance cylinder includes first and second effective diameters;

said balance piston includes a third effective diameter at least partly sealable to said first effective diameter;

said balance piston includes a fourth effective diameter at least partly sealable to said second effective diameter;

means for permitting said first and third effective diameters to control said balancing force when said main valve is within a predetermined distance from said main valve seat;

means for permitting said second and fourth diameters to control said balancing force when said main valve is more than said predetermined distance from said main valve seat; and

said first effective diameter is smaller than said second effective diameter, whereby a valve actuating force is substantially reduced when said main valve is more than said predetermined distance from said main valve seat.

4,928,734

REINFORCED STRIP AND FLEXIBLE HOSES PRODUCED THEREWITH

Toby D. Richards, Morris Plains, and Anthony I. Antonio, Jr., Bridgewater, both of N.J., assignors to Fabricated Plastics, Inc., Morristown, N.J.

Division of Ser. No. 298,839, Jan. 18, 1989, Pat. No. 4,860,796, which is a continuation of Ser. No. 52,553, May 21, 1987, abandoned. This application Apr. 25, 1989, Ser. No. 343,012

Int. Cl.[5] F16L *11/08*

U.S. Cl. 138—154 **4 Claims**

1. A strip for use in forming a flexible hose from helically wound convolutions of said strip, said strip consisting essentially of a substantially U-shaped body portion including a pair of radially projecting, spaced-apart wall members connected by a transverse portion, said spaced-apart wall members including an inner surface, a first end at said transverse portion and a second end defining said opening of said U-shaped body portion, said body portion comprising a polymeric material having a predetermined Young's modulus, substantially the entire surface of said body portion comprising said polymeric material, whereby adjacent portions of said body portion can be directly bonded together to form said flexible hose upon said helical winding of said strip, and a pair of projecting members extending from juxtaposed portions of said pair of wall members, said pair of projecting members extending from said inner surface of said wall members at a location displaced inwardly from said second ends of said wall members and defining a gap within said U-shaped body portion whereby upon the application of external force on said body portion said gap is closed and further distortion of said body portion is prevented thereby and said U-shaped body portion can substantially maintain its U-shaped configuration.

4,928,735

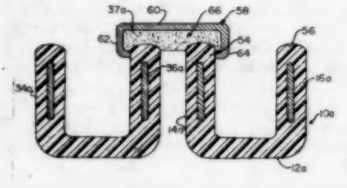
REINFORCED STRIP AND FLEXIBLE HOSES PRODUCED THEREWITH

Toby D. Richards, Morris Plains, and Anthony I. Antonio, Jr., Bridgewater, both of N.J., assignors to Fabricated Plastics, Inc., Morristown, N.J.

Division of Ser. No. 298,839, Jan. 18, 1989, Pat. No. 4,860,796, which is a continuation of Ser. No. 52,553, May 21, 1987, abandoned. This application Apr. 25, 1989, Ser. No. 343,044

Int. Cl.[5] F16L *11/08*

U.S. Cl. 138—154 **6 Claims**



1. A hose comprising a helically wound strip defining a plurality of turns, said strip consisting essentially for a substantially U-shaped body portion including a pair of radially projecting spaced-apart wall members connected by a transverse portion, a body portion comprising a first polymeric material having a predetermined Youngs modulus, substantially the entire surface of said body portion comprising said first polymeric material, whereby displaced sections of each of said wall members are juxtaposed with one another, support means comprising plate-like support members of a second polymeric material having a predetermined Youngs modulus which is higher than said predetermined Youngs modulus of said first polymeric material, said support means being imbedded within said wall portions for reinforcing said wall member and permitting said body portion to substantially retain its shape upon the application of external force thereto, and a generally U-shaped cap member including a crown wall and a pair of lateral walls extending from said crown wall substantially parallel to each other, so as to define a slot therebetween, said juxtaposed sections of said wall members are contained within said slot and bonded to the cap member.

4,928,736

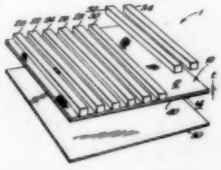
PIPELINE CASING INSULATOR

Larry C. Muszynski, Houston, Tex., assignor to Lone Star Industries, Inc., Houston, Tex.

Filed Jul. 29, 1988, Ser. No. 225,926

Int. Cl.[5] F16L *9/18, 9/14*

U.S. Cl. 138—178 **2 Claims**



1. A pipeline casing insulator to support a coated pipe within a tubular metallic casing, said pipeline casing insulator comprising:

a flexible belt including a strip of material capable of bonding to an organic resin and including a pair of opposed spaced, inner and outer facing surfaces separated by the thickness of said belt and having a length such that said belt may be mounted on said pipe by circumferentially wrapping said belt around the outer coated surface of said pipe with said inner facing surface abutting the outer coated surface of said pipe;

a plurality of runners mounted on said outer facing surface, each runner comprising a hardened casting formed from a polymer concrete that includes an organic resin connecting agent and an aggregate, said aggregate including a mixture of a coarse particulate, substantially incompressible material and a fine filler material, said runners being substantially spaced in an array to support said pipe within said casing and to prevent the outer coated surface of said pipe from contacting the inner surface of said casing, said material forming said runners capable of bonding to said belt when in a plastic state, and said runners are cast directly onto said outer facing surface to mount said runners on said belt; and

means for connecting said belt to said pipe when said belt is mounted on said pipe.

4,928,737

FABRIC FOR THE SHEET FORMING SECTION OF A PAPERMAKING MACHINE

Georg Borel, Reutlingen, Fed. Rep. of Germany, assignor to Hermann Wangner GmbH & Co. KG, Reutlingen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 104,905, Oct. 6, 1987. This application Feb. 14, 1989, Ser. No. 309,893

Claims priority, application Fed. Rep. of Germany, Oct. 7, 1986, 3634134

Int. Cl.[5] D21F 7/10

U.S. Cl. 139—383 A **4 Claims**

1. A fabric for the sheet forming section of a paper making machine comprising a double-layer fabric having a longitudinal thread system interwoven with three transverse thread systems including upper layer transverse threads and lower layer transverse threads disposed in pairs one over the other and additional transverse threads, each additional transverse thread having floats on the paper supporting side of the fabric in the same plane as the upper transverse threads and being interwoven by at least one longitudinal thread in the level of the lower transverse threads, the additional transverse threads being disposed at the point of interweaving in the plane of the lower transverse threads.

4,928,738

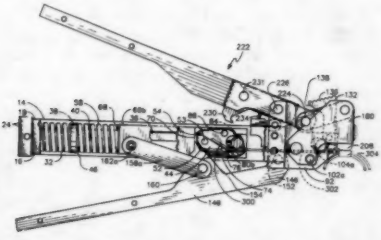
TOOL FOR TIGHTENING CABLE TIES

Hans R. Hinnen, Lakewood, and Miklos B. Marelin, Denver, both of Colo., assignors to Idex, Inc., Denver, Colo.

Filed Jul. 25, 1988, Ser. No. 224,562

Int. Cl.[5] B21F 9/02

U.S. Cl. 140—93.4 **19 Claims**



1. An apparatus for tightening and locking a band clamp having a free end usable in a restricted space, comprising:

first means for engaging a first portion of the band clamp, said means comprising a first substantially flat surface and a first substantially smooth body, said smooth body slidably mounted in a slot angled relative to said first flat surface to allow said first smooth body to slide toward said first flat surface to engage said first portion and to slide away from said flat surface to release said first portion;

second means for holding the band clamp relatively more adjacent to the free end than said first means, said second means comprising a second substantially flat surface and a second substantially smooth body, said second smooth body slidably mounted in a second slot angled relative to said second flat surface to allow said second substantially smooth body to slide toward said second flat surface to securely hold the band clamp therebetween and to slide away from said second flat surface to selectively release the band clamp;

third means for pulling the band clamp in a direction defining a longitudinal axis, away from said first portion, to place the band clamp in a tensioned condition; and

fourth means for locking the band in said tensioned condition without substantially rotating said longitudinal axis with respect to the band clamp.

4,928,739

MOLD FILLING METHOD AND TRANSPORT APPARATUS FOR BEAD-LIKE RESILIENT MATERIAL TRANSPORTED BY A FLUID

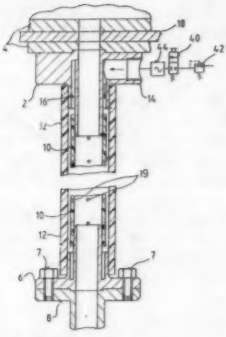
Joachim Teubert, 15 Waldshuter Strasse, 7712 Blumberg 1, Fed. Rep. of Germany

Filed Apr. 14, 1987, Ser. No. 37,968

Claims priority, application Fed. Rep. of Germany, Apr. 21, 1986, 3613380

Int. Cl.[5] B65G 53/06

U.S. Cl. 141—5 **9 Claims**



1. A method for filling a mold with resilient beads which comprises:

passing the resilient beads from a bunker to the mold through a transport tube by means of a transporting fluid;

passing a second fluid, having a pressure equal to or greater than the pressure of the transporting fluid, through one or more channels which are operatively connected to the transport tube by means or orifices in the wall of the tube, whereby an interchange of fluid takes place and the pressure within the tube is equalized so that expansion of the resilient beads and blockage of the tube is prevented.

4,928,740

STUD LINK

Hubert König, Aalen, Fed. Rep. of Germany, assignor to Eisen- und Drahtwerk Erlau Aktiengesellschaft, Aalen, Fed. Rep. of Germany

Filed Jan. 13, 1989, Ser. No. 297,839

Claims priority, application Fed. Rep. of Germany, Jan. 14, 1988, 8800326[U]

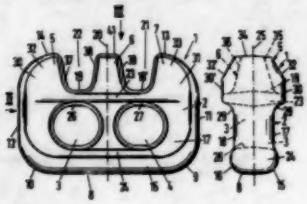
Int. Cl.[5] B60C 27/20

U.S. Cl. 152—243 **20 Claims**

1. In a stud link for a tire chain, including a plate-shaped link body that has a tire contact surface and a wearing surface, with said link body having at least one attachment hole for connection of a chain link, and at least one central wearing element and two other wearing elements, one on each side of said central wearing element, with said wearing elements being

disposed one after the other in longitudinal direction of said stud link, the improvement wherein:

said wearing elements each have oppositely disposed side faces that extend essentially parallel to the longitudinal direction of said stud link, with at least one of said side faces of said central wearing element being recessed relative to the adjacent side face of said other wearing elements, said other wearing elements having a wider configuration than said central wearing element as well as consequently having greater traction as a result of projecting edges thereof, and in addition, volumes of harder regions of the stud link on the wearing side is increased so that the service lift of said stud link is increased.



4,928,741

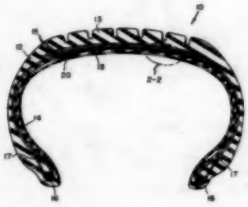
RUBBER TIRE HAVING POLYVINYLIDENE CHLORIDE/ELASTOMER INNER LINER COATING

Grover W. Rye, and John C. Pitman, both of Cuyahoga Falls, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation-in-part of Ser. No. 931,370, Nov. 14, 1986, abandoned. This application Jun. 1, 1988, Ser. No. 200,878

Int. Cl.[5] B60C *5/14*

U.S. Cl. 152—504 **14 Claims**



1. An inflatable rubber article comprising

(a) a cured rubber substrate and

(b) a coating of a polymer blend of low air permeability and high elongation on the inside surface of said substrate, said blend comprising (1) from about 25 to about 85 percent by weight of a copolymer of vinylidene chloride with one or more halogen-free comonomers in which said vinylidene chloride constitutes from about 80 to about 95 percent by weight of said copolymer, and (2) from about 75 to about 15 percent by weight of an elastomer, based on the total weight of polymer present, said polymer blend being a substantially uniform intimate mixture of said vinylidene chloride copolymer and said elastomer in which each is distributed substantially uniformly throughout the entire blend, said coating being formed on said substrate by applying said vinylidene chloride copolymer and said elastomer in aqueous emulsion form to an uncured rubber substrate, evaporating the water of said emulsion and curing the substrate;

said polymer having an elongation of at least 50 percent and an air permeability substantially less than that of an equal thickness of halobutyl rubber.

4,928,742

PNEUMATIC RADIAL TIRE

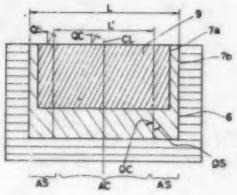
Masahiro Oku, Osaka, and Kazumitsu Iwamura, Kobe, both of Japan, assignors to Sumitomo Rubber Industries, Ltd., Hyogo, Japan

Filed Oct. 13, 1988, Ser. No. 257,000

Claims priority, application Japan, Oct. 13, 1987, 62-259246

Int. Cl.[5] B60C *9/18*

U.S. Cl. 152—534 **10 Claims**



1. A pneumatic radial tire comprising:

a carcass of at least one ply of radially arranged cords turned up around bead cords from the inside to the outside thereof, and

a breaker comprising at least two radially adjacent plies of cords disposed radially outside said carcass,

said breaker having at least a portion in which the cords of each of said two plies are inclined with respect to an equatorial plane of the tire and the cords of one ply are inclined in a direction opposite to the cords of the other ply,

said cords of each of said breaker plies being arranged such that the cord angle in a crown portion of the breaker with respect to the equatorial plane is larger than the cord angle in each shoulder portion of the breaker with respect to the equatorial plane,

the difference between said cord angle in the crown portion and said cord angle in the shoulder portions being not less than 2 degrees, and said cord angles being in the range of 15 to 35 degrees throughout all of the portions of the breaker,

wherein said crown portion is centered on a tire equator and has a width of 0.4 to 0.8 times the maximum width of the breaker, and said shoulder portions are located one on each side of said crown portion.

4,928,743

SINGLE ROD AND LOCK BRACKET SOFT SHADE SYSTEM, KIT AND METHOD

Pamela Wojtysiak, P.O. Box 224, St. John, Ind. 46373

Filed May 8, 1989, Ser. No. 348,408

Int. Cl.[5] A47H *13/14*

U.S. Cl. 160—84.1 **11 Claims**

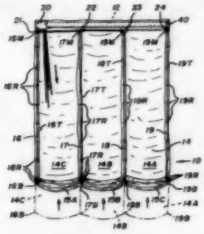
1. A kit for making a raisable soft curtain from a conventional U-shaped curtain rod and a sheet of suitable curtain fabric, the kit comprising:

a plurality of support loops of strong but flexible material and sized so as to freely receive the curtain rod inside the loop and depend below it, each of said loops mounting a main ring such that the main ring may be positioned at or below the curtain rod when the loop is in use, said loops being adapted to be securable to fabric sheet;

a plurality of sets of cord guide rings, one set for each of said loops, each of said sets including a number of rings which may be secured to the fabric in a vertical spaced-apart series under one of said loops;

lengths of cord sufficiently long so as to extend from the bottom of the finished curtain up through said series of guide rings through said main ring and laterally to one edge of the finished curtain and downward therefrom for a sufficient distance to serve as a pull;

a cord releasable lock device for accepting said lengths of cord and means for securing said cord lock device at the



upper side of the finished curtain, said kit being for use in combination with rod-receiving brackets of the type having a vertical horn which projects out of a hole in the top of the receiving end of the curtain rod wherein at least one of said support loops has a wide mesh upper surface so that it can be captivated by the horn of the bracket.

4,928,744

CLUTCH FOR A VERTICAL LOUVRE BLIND

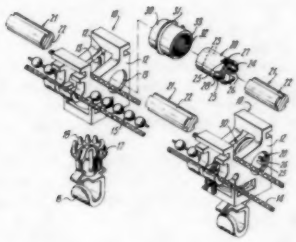
Herman Oskam, Bergambacht, Netherlands, assignor to Hunter Douglas International N.V., Curacao, Netherlands

Filed Feb. 16, 1984, Ser. No. 580,679

Claims priority, application United Kingdom, Aug. 16, 1983, 8321980

Int. Cl.[5] E06B 9/38

U.S. Cl. 160—178.1 **10 Claims**



1. A clutch for a vertical louvre blind traveller, said clutch comprising an inner sleeve having an inner surface and an outer surface, at least one key on the inner surface of the inner sleeve engageable in a groove in a tilt rod which passes through said sleeve, whereby the sleeve may be rotated thereby, at least one pair of slots each defining therebetween an axially extending tongue on said inner sleeve said tongue having an outer surface, an outer sleeve having an inner surface and an outer surface surrounding said inner sleeve, a worm forming element on the outer surface of the outer sleeve, a plurality of splines on the inner surface of said outer sleeve and means on the outer surface of the tongue engageable with the splines effective to cause rotation of the outer sleeve as the inner sleeve rotates, said at least one tongue being at a circumferential location on said inner sleeve corresponding with a groove in said tilt rod, whereby said at least one tongue can flex resiliently radially inwardly into said corresponding groove of said tilt rod, effective to allow continued rotation of said tilt rod and inner sleeve if rotation of the outer sleeve is arrested.

4,928,745

METAL MATRIX COMPOSITE MANUFACTURE

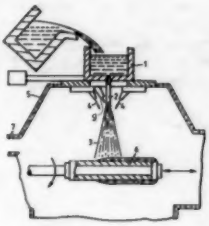
Eric A. Feest, Didcot, England; Peter F. Chesney, Swansea, and Jeffrey S. Coombs, Neath, both of Wales, assignors to United Kingdom Atomic Energy Authority, London, England

Filed Mar. 25, 1986, Ser. No. 843,687

Claims priority, application United Kingdom, Mar. 25, 1985, 8507674

Int. Cl.[5] B22D 23/00

U.S. Cl. 164—46 **3 Claims**



1. A method of making a metal matrix composite material comprising the steps of atomizing a stream of molten metal to form a spray of hot metal particles by subjecting the stream to relatively cold gas directed at the stream, generating a fluidized bed of fine, solid particles of mean particle size less than 10 micrometers and of a ceramic material, allowing fluidized particles to issue from the bed, conveying said particles issuing from the bed by means of a carrier gas and applying the conveyed particles issuing from the bed to the stream or spray, and depositing the metal having said fine particles incorporated therein.

4,928,746

MOULDS FOR METAL CASTING AND SLEEVES CONTAINING FILTERS FOR USE THEREIN

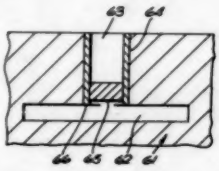
David R. Butler, Lichfield; George Snow, Worcester; Philip Sandford, Birmingham; Max G. Neu, Lichfield, all of England; Jean P. Villani, Charleville Mezieres, France; Alain Teyssedre, Charleville Mezieres, France, and Roland Lenoir, Flize, France, assignors to Foseco International Limited, Birmingham, England

Filed Jan. 18, 1989, Ser. No. 298,049

Claims priority, application United Kingdom, Jan. 30, 1988, 8802082; Jan. 30, 1988, 8802083; Jul. 30, 1988, 8818186; Jul. 30, 1988, 8818229

Int. Cl.[5] B22C 9/08

U.S. Cl. 164—362 **40 Claims**



1. A mould for metal casting comprising:

means defining a mould cavity;

means defining one or more sprues communicating directly with said mould cavity and providing the sole means of entry of molten metal into said mould cavity for forming a casting;

a sleeve of refractory material located in each said sprue;

a ceramic foam filter disposed in each said sleeve; and

means cooperable between each said filter and said sleeve for fixing said filter in said sleeve at a location spaced from the surface of the casting defined by the mould cavity.

4,928,747

SIDE WALL GEOMETRY FOR MOLDS FOR CASTING OF THIN SLABS

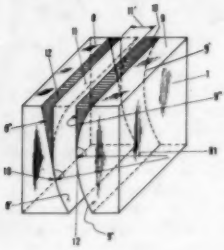
Fritz-Peter Pleschiutschnigg, Duisburg; Gerd Moellers, Oberhausen; Hans-Georg Eberhardt, Duisburg; Werner Rahmfeld, Muelheim; Lothar Parschat, Ratingen, and Hans-Juergen Ehrenberg, Duesseldorf, all of Fed. Rep. of Germany, assignors to Mannesmann AG, Duesseldorf, Fed. Rep. of Germany

Filed Jun. 21, 1988, Ser. No. 209,689

Claims priority, application Fed. Rep. of Germany, Jul. 22, 1987, 3724628

Int. Cl.[5] B22D *11/04*

U.S. Cl. 164—418 **6 Claims**



1. In a mold for continuous casting in a vertical direction and having a plurality of walls, including two walls defining respectively the two long or wide sides of a slab ingot to be cast, the two corresponding walls respectively having inwardly oriented and facing wall surfaces, one of said surfaces being convex, the other one concave, the inprovement comprising respectively lower surface portions of the two wall surfaces being concentrically curved, at least one of said lower surface portions merging into an upper surface portion along a tangent that extends upwardly and outwardly vis-a-vis the interior of the mold.

4,928,748

CONTINUOUS CASTING OF THIN METAL STRIP

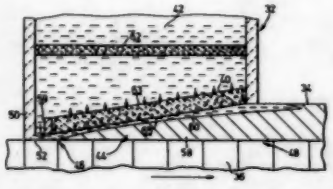
Roderick I. L. Guthrie, Quebec, Canada, and Joseph G. Herbertson, New South Wales, Australia, assignors to R. Guthrie Research Associates Inc., Westmount, Canada

Filed May 6, 1988, Ser. No. 190,916

Claims priority, application Canada, May 6, 1987, 536533

Int. Cl.[5] B22D *11/06, 11/10*

U.S. Cl. 164—479 **18 Claims**



1. Apparatus for casting metal continuously in strip form, the apparatus comprising:

a tundish for containing molten metal and having an outlet through which the molten metal flows under pressure into a work zone having upstream and downstream ends;

a travelling chilled substrate positioned to receive the molten metal in the work zone and moveable from the upstream to the downstream end of the work zone, the tundish and the substrate combining to close the said upstream end to substantially exclude entry of air into the work zone through said upstream end, and a portion of the metal flow through the outlet being at the upstream end of the work zone;

means adapted to drive the substrate at a selected velocity; and

a pervious flow restricting element at the outlet of the tundish and having an efficient cross-section for flow of molten metal through the element to maintain essentially non-turbulent flow as the molten metal meets the substrate and solidifies as a shell on the substrate, the shell increasing in thickness from the upstream end to the downstream end of the work zone as the molten metal solidifies in the work zone, and the restricting element being spaced from the shell to provide space for a layer of molten metal under pressure and in lubricating contact with th- element such that the molten metal flows from the restricting element onto the shell and then in the direction of motion of the substrate.

12. A method of continuously casting molten metal comprising the steps of:

containing the molten metal for flow downwardly into a work zone having a closed upstream and an open downstream end, part of the flow being at the upstream end of the work zone, and at least some of the flow being through a pervious flow restricting element having an inlet surface in fluid communication with the molten metal and an outlet surface in fluid communication with the work zone where the metal is restrained and shaped, and wherein fluid communication is established through said element by a plurality of openings extending along the width and length of the element;

cooling the metal in the work zone to cause at least some of the metal to solidify against a chilled substrate passing through the work zone from the upstream to the downstream end of the work zone to form a growing shell of solidified metal in the work zone;

maintaining a depth of molten metal between the shell and the outlet surface of the element sufficient to provide lubrication between the outlet surface and the solidifying metal without significant turbulence; and

driving the substrate at a rate commensurate with the molten metal supply rate and adapted to ensure that the molten metal in the work zone is under positive pressure to enhance the finish on the solid metal in contact with the substrate.

4,928,749

HEAT EXCHANGE RECOVERY METHOD

James B. Paull, Andover, Mass., assignor to Industrial Energy Corporation, Andover, Mass.

Continuation-in-part of Ser. No. 731,525, May 8, 1985, abandoned. This application Sep. 29, 1986, Ser. No. 912,991

Int. Cl.[5] F23F *19/00*

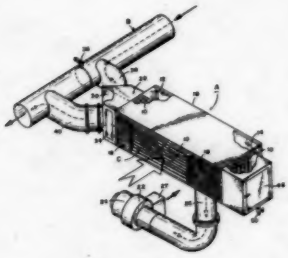
U.S. Cl. 165—1 **5 Claims**

1. A method for cooling and purifying an exhaust stream of hot air flowing through a lateral duct and for at least partially heating fresh air, said exhaust stream being contaminated with finely divided solids and vaporized liquids said method comprising the steps of:

laterally diverting said exhaust stream away from said duct through first lateral indirect heat exchange means, comprising lateral heat exchange tubes next laterally centrifugally flowing said exhaust stream through a transfer chamber and then laterally returning said exhaust stream to said duct through second lateral indirect heat exchange means comprising lateral heat exchange tubes,

simultaneously laterally cross-flowing fresh air across said first and second indirect heat exchange means in indirect heat exchange contact with said exhaust stream,

setting the rate of flow of said fresh air to provide a fresh air flow sufficient to cool said exhaust stream in said first indirect heat exchange means to a temperature not lower than a temperature within 5° F. above the dew point of said vaporized liquids and to cool said exhaust stream in said second indirect heat exchange means to a temperature



below the dew point of said vaporized liquids sufficiently to at least partially liquefy said vaporized liquids,

a. separating and collecting said finely divided solids in said transfer chamber for discharge therefrom,

b. collecting said liquefied vaporized liquids condensed within said second indirect heat exchange means in said transfer chamber for discharge therefrom, and

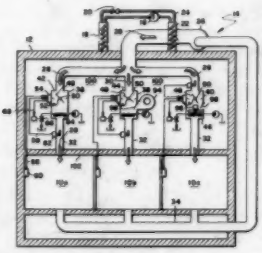
c. collecting heated fresh air from said first and second indirect heat exchange means for discharge to a heating operation.

4,928,750

VAV VALVE WITH PWM HOT WATER COIL

Mark E. Nurczyk, Eastman, Wis., assignor to American Standard Inc., New York, N.Y.

Filed Oct. 14, 1988, Ser. No. 257,566
Int. Cl.[5] **F24F** *11/053, 11/06;* **F25B** *29/00*
U.S. Cl. 165—2 **11 Claims**



10. A method of temperature conditioning a comfort zone comprising the steps of:

drawing air from said comfort zone;

cooling said air to produce temperature conditioned supply air;

conveying said supply air back to said comfort zone by way of a VAV valve;

sensing the flow rate of said supply air passing through said VAV valve;

setting a desired set point temperature of said comfort zone;

sensing a zone temperature of said comfort zone;

when said zone temperature is above said set point temperature, varying the degree of opening of said VAV valve as a function of said temperature of said comfort zone, said set point temperature, and the flow rate of said supply air; and

when said zone temperature is below said set point temperature,

i. positioning said VAV valve to provide a substantially constant flow rate of said supply air,

ii. drawing ambient air from above said comfort zone into said VAV valve.

iii. heating said supply air and said ambient air to a temperature greater than said zone temperature using a coil conveying a heated fluid through said VAV valve, and

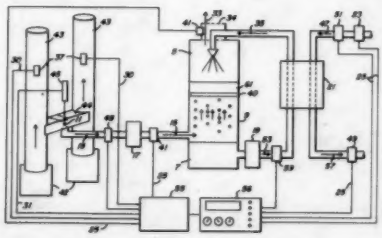
iv. regulating the average flow rate of said fluid by open and close cycling of a solenoid valve connected to said coil with an open period of said solenoid valve relative to a closed period of said solenoid valve increasing as said zone temperature decreases, said closed period being of a predetermined maximum closed-period to avoid uncomfortable temperature fluctuations of said supply air.

4,928,751

COMPUTER CONTROLLED WASTE HEAT RECLAIMER

Frank P. Fischer, Jr., New Orleans, La., assignor to The Eldon Corporation, Jefferson, La.

Filed May 25, 1988, Ser. No. 198,506
Int. Cl.[5] **F28F** *27/00, 27/02;* **G01K** *17/06;* **B01D** *19/00*
U.S. Cl. 165—11.1 **2 Claims**



1. A control device for a heat reclaiming unit, which heat reclaiming unit is of the type which includes:

a primary heat exchanger for receiving waste gases from a stack or other source and for receiving cool water from a primary source of water and for mixing said gases and water to heat the primary water while cooling the gases,

a secondary heat exchanger having a secondary flow of water,

means for delivering the heated primary water to the secondary heat exchanger and into heat exchanging relation with the secondary flow of water to heat the secondary flow of water,

means for delivering waste gases to said primary heat exchanger, said control unit including:

means for sensing the temperature of said gases being delivered to said primary heat exchanger and for creating a signal indicative of said temperature,

means for sensing the temperatures of said secondary flow of water both before it enters heat exchanging relation with said primary flow and after it leaves such heat exchanging relation and for creating electrical signals indicative of said termperatures,

means for sensing the flow pressure of said secondary flow of water and for creating an electrical signal indicative of said flow pressure,

means for sensing the flow pressure of the heated primary water and for creating an electrical signal indicative of said flow pressure,

logic and control means for receiving said signals and displaying indications of the flow pressures and temperatures, said logic and control further including

means responsive to the sensed temperature of the gases being delivered to the primary heat exchanging means for warning an operator if the gases are below a given low temperature and for shutting off said means for delivering waste gases and said means for delivering primary water if said temperature is above a given high temperature,

means for warning the operator if the flow pressure in either said means for delivering waste gases or said means for delivering primary water is below a given level indicative that the respective flow has ceased,

means responsive to said signals indicative of the temperatures and flow pressure of the secondary source of water for calculating the rate of heat energy gain in said secondary flow of water as a result of passing through said secondary heat exchanger, and for displaying the rate of heat energy gain calculated

means for indicating to an operator that said heat gain amount is below a given amount, and

means to display an indication of the time since a particular component of said unit has been serviced.

4,928,752

METHOD FOR RECOVERING LATENT HEAT FROM A HEAT TRANSFER MEDIUM

Magnus H. Von Platen, Lupingatan 8, S-233 00 Svedala, Sweden

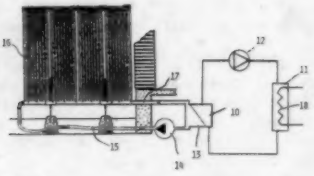
PCT No. PCT/SE88/00140, § 371 Date Sep. 26, 1989, § 102(e) Date Sep. 26, 1989, PCT Pub. No. WO88/07161, PCT Pub. Date Sep. 22, 1988

PCT Filed Mar. 21, 1988, Ser. No. 411,456

Claims priority, application Sweden, Mar. 20, 1987, 8701157

Int. Cl.[5] F25D *17/02*

U.S. Cl. 165—104.17 **1 Claim**



1. Method for recovering latent heat from a heat transfer medium which is circulated through a closed system through a heat collector and a heat exchanger for heat exchange with the evaporator in a refrigerating circuit, characterized in that the heat transfer medium, comprising a mixture of water and alcohol, is sucked from the heat exchanger to provide an underpressure for atomization of the heat transfer medium with following generation of bubbles in the heat transfer medium, ice crystals then being precipitated and the ratio of water and alcohol thus being changed, the heat transfer medium with ice crystals entrained therein then being supplied to the heat collector under overpressure.

4,928,753

HEAT EXCHANGER

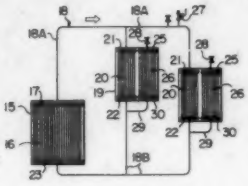
Ikuo Kotaka, Hiroshima, Japan, assignor to Babcock-Hitachi Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 728,869, Apr. 30, 1985, abandoned, which is a division of Ser. No. 622,725, Jun. 20, 1984, Pat. No. 4,616,697. This application May 19, 1989, Ser. No. 355,109

Claims priority, application Japan, Jun. 21, 1983, 58-110235; Jun. 21, 1983, 58-110233; Jun. 22, 1983, 58-94949[U]

Int. Cl.[5] F28D *15/02*

U.S. Cl. 165—104.27 **12 Claims**



1. A heat exchanger incorporating a heat pipe apparatus, said heat pipe apparatus comprising:

evaporative pipe group means disposed within a flow of a heating fluid;

first condenser pipe group means for transmitting heat outside thereof, spaced from said evaporative pipe group means;

first passage means for connecting said evaporative pipe group means with said first condenser pipe group means and for circulating therethrough a working medium between said evaporative pipe group means and said first condenser pipe group means;

second condenser pipe group means for transmitting heat outside thereof and operatively associated with said evaporative pipe group means;

said first condenser pipe group means and said second condenser pipe group means being disposed within at least one flow of fluid to be heated;

second single passage means for connecting a lower header of said second condenser pipe group means with said first passage means between a lower header of said first condenser pipe group means and said evaporative pipe group means for improving removal of non-condensible medium; and

separator means for non-condensible gas provided at an upper header of said second condenser pipe group means, through which an interior portion of said second condenser pipe group means is to be communicated with an exterior portion thereof.

4,928,754

HEAT EXCHANGING APPARATUS

Anders Westerberg, Gnejsstigen 20, S-951 64 Luleå , Sweden

PCT No. PCT/SE88/00161, § 371 Date Sep. 19, 1989, § 102(e) Date Sep. 19, 1989, PCT Pub. No. WO88/07608, PCT Pub. Date Oct. 6, 1988

PCT Filed Mar. 30, 1988, Ser. No. 411,457

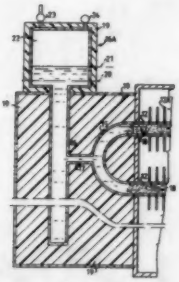
Claims priority, application Sweden, Mar. 30, 1987, 8701318

Int. Cl.[5] F28F *17/00*; **E03B** *7/10*

U.S. Cl. 165—134.1 **10 Claims**

1. Heat exchanging or circulation apparatus comprising a system of conduits connected to an inlet and an outlet for circulating water or other practically incompressible liquid through the system, heat being transferred through the conduit walls, circulation in said apparatus being periodically shut off, whereupon continued heat transfer through the conduit walls causes freezing of the liquid to ice in the conduits, characterized in that two first portions of said system are relatively heat-insulated or shielded from flowing cold air to obtain

delayed freezing of water in said portions in relation to the freezing of the liquid to ice in uninsulated second portions of said system located between said first two portions so that ice growing in said second portions towards the ends thereof being in communication with said two first portions will result



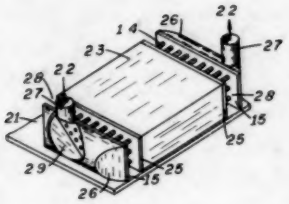
in an increased pressure on the unfrozen liquid in said insulated portions of the system, said increased water pressure being relieved by having said two first portions each connected through insulated branch conduits with a closed insulated pressure relief or absorbing means so as to avoid rupture of the conduits in any portion of the system.

4,928,755

MICROTUBE STRIP SURFACE EXCHANGER

Francis D. Doty, and Jonathan B. Spitzmesser, both of Columbia, S.C., assignors to Doty Scientific, Inc., Columbia, S.C.

Filed May 31, 1988, Ser. No. 200,139
Int. Cl.[5] F28F 3/12
U.S. Cl. 165—168 **8 Claims**



1. An exchanger for the transfer of heat between an objective surface and a working fluid, comprising:

a plurality of parallel disposed planar rows of metallic tubes, said tubes having outside diameter of less than 3 millimeters, and a length between 40 and 1000 times said outside diameter;

a first header tubestrip joined to one end of each of said tubes;

a second header tubestrip joined to the other end of each of said tubes;

first manifold means connected to said first tubestrip for defining a fluid inlet flow path into one end of each of said tubes;

second manifold means connected to said second tubestrip for defining a fluid inlet flow path from said other end of each of said tubes; and

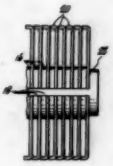
a solid metal matrix in thermal contact with the surfaces of said tubes, said matrix occupying a major fraction of the rectangular prismatic space between and defined by said first and second tubestrips, said matrix having at least one external transfer surface suitable to be in thermal contact with said objective surface, and said matrix having a melting point below that of said tubes.

4,928,756

HEAT DISSIPATING FIN AND METHOD FOR MAKING FIN ASSEMBLY

William Shull, Aptos; Rudolph Nissen, Pescadero, and Alexander Drobshoff, Mountain View, all of Calif., assignors to Spectra-Physics, San Jose, Calif.

Filed Aug. 4, 1988, Ser. No. 228,296
Int. Cl.[5] F28F 1/30
U.S. Cl. 165—182 **17 Claims**



1. A compressible heat-dissipating fin, attached to a tube, comprising a metal plate having a flange and a peripheral edge, said flange defining an aperture adapted to compress against the tube, said peripheral edge of the plate defining a pair of opposed substantially parallel lips, and wherein the plate, the pair of lips, and the flange are formed from a single piece of metal, said plate further comprising a first slit defined by the plate and extending from the aperture to the peripheral edge of the plate and a second slit defined by the plate and extending from the flange to the peripheral edge of the plate, and wherein the compressible heat-dissipating fin is attached to the tube by means other than welding.

4,928,757

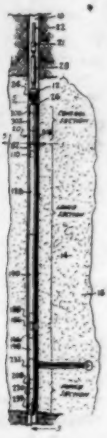
HYDRAULIC WELL PENETRATION APPARATUS

Herman J. Schellstede, New Iberia, La.; Robert W. McQueen, Houston, and Alan D. Peters, Katy, both of Tex., assignors to Penetrators, Inc., Houston, Tex.

Continuation-in-part of Ser. No. 42,191, Apr. 24, 1987, Pat. No. 4,790,384. This application Dec. 5, 1988, Ser. No. 279,648
The portion of the term of this patent subsequent to Nov. 22, 2005, has been disclaimed.
Int. Cl.[5] E21B 43/112, 7/18
U.S. Cl. 166—55.1 **28 Claims**

1. In a well penetrator of the type including housing means capable of being lowered down the interior of a well casing, a work fluid input means in said housing means, a movable punch member having an inner end and an outer end and being movable between a retracted position and an extended position, said outer end of said movable punch member including casing cutting means for cutting an opening in a casing when moved forcefully outwardly toward said extended position, punch support means supporting said punch member for movement relative to said housing means between said retracted position in which said outer end of said punch member is positioned substantially within the confines of said housing

means and said extended position in which said outer end of said punch member is positioned outwardly of said housing means, power actuated punch drive means mounted in said housing means for selectively moving said punch member between its retracted and extended positions, high pressure lance means having nozzle means mounted on one end for movement in said punch member between a retracted position in which said nozzle means is positioned internally of said punch member and an extended position in which said nozzle means is positioned outwardly of said punch member for discharging a high pressure jet outwardly beyond the outer end of said punch member for cutting and removing the surrounding earth formation, lance positioning drive means mounted in said housing means for selectively moving said lance and nozzle toward their extended position and for retracting said lance and nozzle toward their retracted position, first punch work fluid supply means connected to said punch drive means for actuating said punch drive means to cause the punch to move toward its extended position, second punch work fluid supply means connected to said punch drive means for activating said punch drive means to move the punch toward its retracted position, first lance work fluid supply means connected to lance positioning drive means to cause movement of said nozzle toward its extended position, second lance work fluid supply means connected to said lance positioning drive means to cause said nozzle to move toward its retracted position, control valve means mounted in said housing means including a movable valve member mounted for movement between a first position in which said control valve means directs work fluid to said first punch work fluid supply means and said first lance work fluid supply means and a second position in which said control valve means directs work fluid to said second punch work fluid supply means and said second lance work fluid supply means, said movable valve means having a portion contacted by work fluid from said work fluid input means so that said movable valve member is urged toward said second position by the pressure of work fluid in said work fluid input means, the improvement comprising spring means for applying force to said moveable valve member for urging said movable valve member toward its first position in response to the pressure of said work fluid in said work fluid input means being below a predetermined critical value so that said punch means and said nozzle means are positioned in their retracted positions and for permitting said movable valve member to move its second position in response to the pressure of said work fluid in said work fluid input means exceeding said critical pressure.

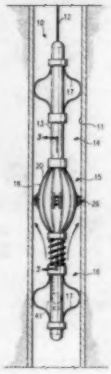


4,928,758

DOWNHOLE WELLBORE FLOWMETER TOOL

Robert W. Siegfried, II, Richardson, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Oct. 10, 1989, Ser. No. 418,507
Int. Cl.[5] E21B *47/00*
U.S. Cl. 166—66 11 Claims



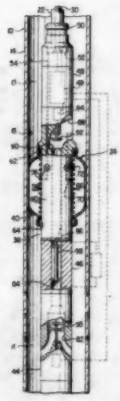
1. A downhole flowmeter tool adapted to be lowered into a wellbore for measuring a flow parameter, said tool comprising:
expansible means for forming an annulus between said tool and the wall of the wellbore thereby providing a restrictive flow passage around said tool; and
means positioned in said annulus for sensing flow through said restrictive flow passage.

4,928,759

TUBING CONVEYED WELLBORE FLUID FLOW MEASUREMENT SYSTEM

Robert W. Siegfried, II, Richardson; Lonnie J. Smith, Allen, and H. Mitchell Cornette, Plano, all of Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Feb. 1, 1989, Ser. No. 305,250
Int. Cl.[5] E21B *43/119*
U.S. Cl. 166—65.1 9 Claims



1. An instrument for insertion into a wellbore for determin-

ing at least one of the fluid flow rate and the composition of fluids being produced in the wellbore, said instrument being adapted to be inserted in the wellbore at the end of an elongated tubing string, said tubing string being adapted to conduct pressure fluid to said instrument, said instrument being characterized by: a first section including means for connecting said instrument to said tubing string and first passage means for receiving pressure fluid from said tubing string;

a second section including a portion of said first passage means and second passage means for conducting wellbore fluids from a first space in said wellbore to a second space in said wellbore;

fluid pressure actuated seal means on said instrument including means forming a chamber operable to be in receipt of pressure fluid from said tubing string for causing said seal means to move into substantially fluid tight engagement with a wall of said wellbore to form said first and second spaces in said wellbore;

valve means in communication with said first passage means and with said chamber for controlling the flow of pressure fluid to said chamber from said tubing string for causing said seal means to form said seal between said first space and said second space in said wellbore; and

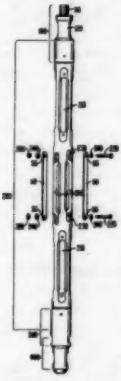
shutoff valve means interposed in said second passage means and operable at will for controlling the flow of wellbore fluid through said instrument.

4,928,760

DOWNHOLE COUPON HOLDER

Elizabeth A. Freitas, Rangely, Colo., assignor to Chevron Research Company, San Francisco, Calif.

Filed Oct. 24, 1988, Ser. No. 261,452
Int. Cl.[5] E21B *41/02, 49/08*
U.S. Cl. 166—113 **11 Claims**



1. An apparatus for holding elongated coupons within a wellbore comprising a non-metallic, elongated member having:

a. longitudinally elongated recessed slots and

b. mounting means for mounting said elongated coupons completely within said recessed slots.

8. An apparatus for holding coupons within a wellbore comprising a non-metallic, elongated member having:

a. pairs of recessed slots, with each pair of slots being on opposite sides of said elongated member; and

b. mounting means for mounting said coupons within said recessed slots;

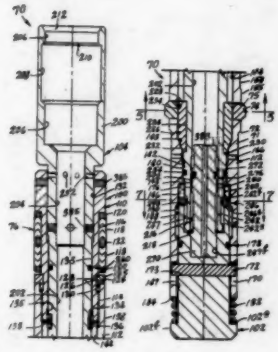
wherein said pairs of slots share a common mounting means that fixes the ends of coupons within those pairs of slots, and wherein said common mounting means are metallic bolts and nuts which form electrical connections for coupons within those pairs of slots for galvanic testing of said coupons.

4,928,761

TWO-WAY PLUGS FOR WELLS

Imre I. Gazda, Fort Worth, and Dannie R. Collins, The Colony, both of Tex., assignors to Otis Engineering Corporation, Dallas, Tex.

Filed Jul. 17, 1989, Ser. No. 381,161
Int. Cl.[5] E21B *23/02*
U.S. Cl. 166—123 **26 Claims**



1. A device for plugging a well flow conductor having a landing receptacle therein, said device comprising:

(a) tubular housing means having a bore extending therethrough;

(b) means on said housing means for releasably locking said housing means in said landing receptacle;

(c) means sealing between said housing means and the inner wall of said landing receptacle;

(d) means including a plug member for closing the lower end of said bore of said housing means, said plug member being movable longitudinally relative to said housing means between upper and lower positions;

(e) mandrel means reciprocable in said bore of said housing means for actuating said locking means to locking position in response to relative downward movement of said mandrel means and for allowing said locking means to move to releasing position in response to relative upward movement of said mandrel means, said mandrel means having a fishing neck at its upper end providing a downwardly facing shoulder engageable by a running tool; and

(f) means for releasably locking said mandrel means to said plug member when said mandrel means in its lower position and said plug member is in its upper position, said mandrel means being released from said plug member in response to relative downward movement of said plug member.

4,928,762

RETRIEVABLE BRIDGE PLUG AND PACKER

Kevin R. Mamke, Lewisville, Tex., assignor to Halliburton Company, Duncan, Okla.

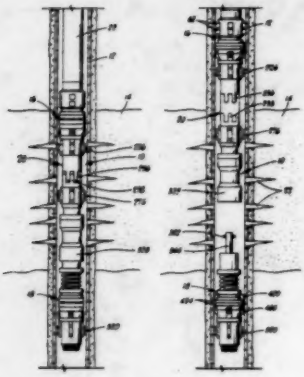
Filed Feb. 13, 1989, Ser. No. 310,276
Int. Cl.[5] E21B *33/12*
U.S. Cl. 166—192 **16 Claims**

1. An apparatus for use in a well bore, said apparatus comprising:

plug means for sealingly engaging said well bore when in a set position;

plug setting means for setting said plug means by applying torque in one direction to a portion thereof;

packer means, disconnectable from said plug means, for sealingly engaging said well bore when in a set position at a location spaced from said plug means;



means for disconnecting said packer means from said plug means after setting of said plug means; and

packer setting means for setting said packer means by applying torque in said one direction to a portion thereof.

4,928,763

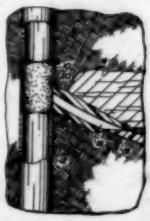
METHOD OF TREATING A PERMEABLE FORMATION

David O. Falk, Denver, Colo., assignor to Marathon Oil Company, Findlay, Ohio

Filed Mar. 31, 1989, Ser. No. 331,486

Int. Cl.[5] F21B *33/138, 43/32, 47/00*

U.S. Cl. 166—250 **10 Claims**



1. In an oil well having a vertical wall bore and a transverse bore extending therefrom, a method of permanently plugging a zone intersected by the transverse bore to prevent fluid flow from said zone into the transverse bore, comprising the steps of:

temporarily blocking the transverse bore against fluid flow therethrough at a location below said zone, subsequent to all drilling equipment being removed from said vertical well bore and said transverse bore;

introducing plugging material into said zone to permanently block fluid flow from said zone into the transverse bore; and

removing the temporary blockage from the transverse bore to permit fluid flow through the transverse bore and into the vertical bore.

4,928,764

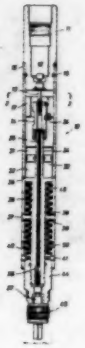
WIRELINE TOOL CABLE HEAD OVERLOAD APPARATUS

Dennis E. Roessler, Houston, Tex., assignor to Halliburton Logging Services, Inc., Houston, Tex.

Filed Sep. 20, 1989, Ser. No. 409,897

Int. Cl.[5] G01L *1/00;* **E21B** *47/12*

U.S. Cl. 166—250 **7 Claims**



1. A cable head adapted to support a sonde in a well borehole which comprises:

(a) an upper end assembly adapted for connection with a cable extending into a well borehole;

(b) a lower end assembly adapted for connection to a sonde to be supported by the cable in the well borehole;

(c) yieldable means joining said upper and lower assemblies together in a fixed but yieldable relationship wherein a controllable and variable load is imparted to the cable thereabove during movement and variations in load on the cable are maintained within specified limits;

(d) said yieldable means further including dead weight adjustable means notwithstanding variations in the dead weight of the load, and said yieldable means includes resilient means permitting movements within a desired range dependent on the adjustment thereof and bracketing a selected relative position of said upper and lower end assemblies;

(e) an electrical contact;

(f) a centrally located cam having a cam surface with an axis of rotation through said cam, said cam axis extending lengthwise of said upper and lower end assemblies;

(g) means controllably rotating said cam to index said cam surface;

(h) means supporting said contact operatively positioned relative to said cam surface for load variant contact to said cam surface; and

(i) a circuit connected through said contact to form an electrical signal indicative of excessive load at the cable head.

4,928,765

METHOD AND APPARATUS FOR SHALE GAS RECOVERY

Donald H. Nielson, Salt Lake City, Utah, assignor to Ramex Syn-Fuels International, Nev.

Filed Sep. 27, 1988, Ser. No. 249,649

Int. Cl.[5] E21B *43/243*

U.S. Cl. 166—251 **3 Claims**

1. A method for the in situ recovery of natural gas from an undisturbed shale bed formation in a condition ready for transmission through a gas pipeline to end users and substantially without the formation of liquid products comprising:

forming a heater assembly having an elongated substantially cylindrical outer housing.

providing said elongated heater assembly with an interior containing a fuel gas burner therewithin joined to an upwardly extending fuel gas supply line and including in said interior an upwardly extending product gas line disposed adjacent an upwardly extending combustion air line.

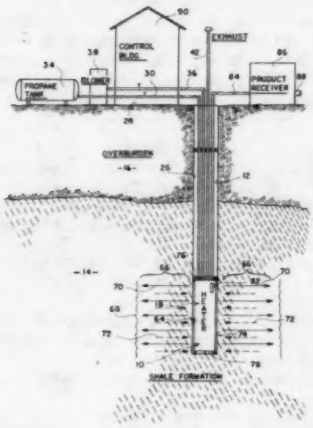
drilling a borehole into a subterranean shale bed formation.

lowering said heater assembly into said borehole to a position surrounded by the shale bed formation with said borehole having been drilled to define a diameter relative said heater assembly housing insuring a close fit therebetween while providing a gas space therebetween,

supplying fuel gas to said fuel gas supply line from fuel gas supply means disposed above ground,

supplying combustion air to said combustion air line from combustion air supply means disposed above ground,

regulating said gas supply means and said combustion air supply means to operate said fuel gas burner to heater said heater assembly outer housing and thence, through convection and radiation, to progressively and radially heat the surrounding undisturbed shale bed formation,



monitoring the temperature of the heated shale bed formation and manipulating said regulating of said supply means to maintain the temperature of the heated shale bed formation at approximately 1200 degrees F.,

insuring, during said regulating of said gas supply means and said combustion air supply means, that a temperature of over 1000 degrees F. is maintained,

insuring, during said monitoring of the temperature of the heated shale bed formation, that a temperature of less than 1500 degrees F. is maintained, whereby,

maintenance of the temperature at approximately 1200 degrees F. reports the kerogen content of the shale bed formation to evolve substantially solely natural gas with the natural gas migrating to said borehole adjacent said heater assembly without significant disturbance of the shale bed formation,

collecting the natural gas from said borehole through said product gas line and

providing a seal member within aid borehole above said heater assembly, whereby

natural gas within said borehole is precluded from exiting said borehole other than through said product gas line.

4,928,766

STABILIZING AGENT FOR PROFILE CONTROL GELS AND POLYMERIC GELS OF IMPROVED STABILITY

Dennis H. Hoskin, Lawrenceville, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Feb. 16, 1989, Ser. No. 311,303
Int. Cl.[5] E21B *33/138, 43/22, 43/24*
U.S. Cl. 166—270 **9 Claims**

1. A process for recovering oil from a subterranean oil-bearing formation having relatively high permeability zones and relatively low permeability zones penentrated by at least one injection well and at least one production well in fluid communication with a substantial portion of the formation, comprising the steps of:

(a) injecting into the relatively high permeability zones of the formation via the injection well an aqueous gel-forming solution comprising water, a vicosifying amount of a water-dispersible polymer; a crosslinking agent in an amount effective to cause gelation of the aqueous solution of the water-dispersible polymer; and a stabilizing agent comprising a heterocyclic compound in an amount effective to reduce syneresis of the gel-forming composition, whereby upon gelation of the solution the zones of relatively high permeabilty of the formation are selectively plugged;

(b) injecting a flooding fluid into the formation via the injection well that preferentially enters the low permeability zones; and

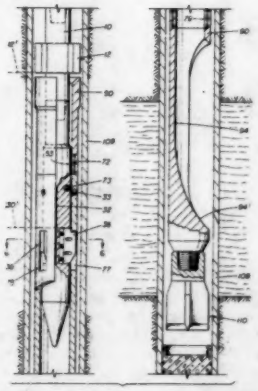
(c) recovering fluids including oil from the formation via the production well.

4,928,767

METHOD AND APPARATUS FOR SETTING AND RETRIEVING A DEFLECTION TOOL

Henk H. Jelsma, Spring, Tex., assignor to Baroid Technology, Inc., Houston, Tex.

Continuation-in-part of Ser. No. 174,083, Mar. 28, 1988, abandoned. This application Apr. 27, 1989, Ser. No. 344,019
Int. Cl.[5] E21B *7/08, 23/00*
U.S. Cl. 166—377 **5 Claims**



2. In a method of setting and retrieving a deflector section from an earth borehole, wherein said deflector section has already been set in said borehole, the improvement comprising running a retrievable tool into the borehole until a portion of the retrievable tool rests against said deflector section, rotating said retrievable tool no more than one complete revolution, without picking up on said retrievable tool, to thereby latch up the retrievable tool to the deflector section; and lifting up the retrievable tool to thereby retrieve the said deflector section from the earth borehole.

3. A system for setting and retrieving a deflector section from an earth borehole, comprising:

a first assembly having first and second ends and a longitudinal axis between said first and second ends, wherein said second end comprises a deflector section, said first assembly including a cylindrical shell of a given internal diameter and said first end having at least one shear pin receiving hole in said shell and at least one latch pin receptacle in said shell;

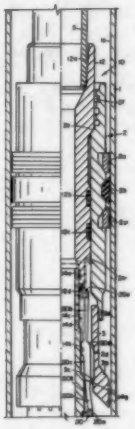
a second assembly having first and second ends and a longitudinal axis between said first and second ends wherein the second end of said second assembly comprises a probe sized to fit within the said interior of said first assembly, said second assembly including at least one shear pin sized to fit said at least one shear pin receiving hole, and also including at least one spring-loaded latch pin mechanism sized to fit within the said at least one latch pin receptacle, said second assembly further comprising stop means to limit the travel of said probe within the interior of said first assembly, whereby said at least one latch pin mechanism is in the same plane as that of the said at least one latch pin receptacle, said plane being perpendicular to the longitudinal axis of each of the said first and second assemblies, whenever the travel of said probe is so limited.

4,928,768

SUMP PACKER LATCHING MECHANISM

Elmer R. Peterson, The Woodlands, Tex., assignor to Baker Hughes Incorporated, Houston, Tex.

Filed Feb. 9, 1989, Ser. No. 308,878
Int. Cl.[5] E21B *22/02*
U.S. Cl. 166—380 **22 Claims**



1. Apparatus for effecting successive locking and unlocking of a tubing string to a hollow bore packer secured downhole in a subterranean well bore wherein the locking of the tubing string to the hollow bore packer can withstand a tensile force on the order of about 100,000 pounds, comprising, in combination:

means on said hollow bore packer defining a downwardly facing internal shoulder;

a tubular locking mechanism secured to the bottom of said tubing string;

said locking mechanism comprising an inner mandrel element secured to said bottom end of the tubing string, and a locking sleeve freely surrounding said inner mandrel element and carrying a plurality of peripherally spaced, radially shiftable locking means;

supporting means on said inner mandrel element engagable and disengagable with said locking means by axial movements of said inner mandrel relative to said locking sleeve to permit radial shifting and retraction of said locking means into and out of engagement with said downwardly facing internal shoulder; and

J-pin and slot means interconnecting said inner mandrel and said locking sleeve, said J-pin and slot means permitting rotational movements of said locking sleeve relative to said mandrel but permitting only limited axial movements of said packing sleeve relative to said mandrel whereby a first cycle of successive downward and upward movements of the tubing string effects the rigid locking of said locking means with said downwardly facing, internal shoulder and a second cycle of downward and upward movements of the tubing string effects the release of said locking means from said internal shoulder.

18. The method of releasably, lockingly engaging the end of a tubing string in a hollow bore packer set in a subterranean well comprising the steps of:

providing a downwardly facing internal shoulder in said hollow bore packer;

securing a locking tool to the end of a tubing string and inserting the locking tool through the well bore to a locking position adjacent and below said downwardly facing shoulder only by downward movement of said tubing string followed by upward movement of said tubing string; and

releasing said locking tool from said locking position relative to said downwardly facing locking shoulder only by downward movement of said tubing string to a releasing position and retaining said locking tool in said releasing position during subsequent upward movement of said tubing string.

4,928,769

CASING HANGER RUNNING TOOL USING STRING WEIGHT

Lionel J. Milberger, Houston, Tex.; Philippe C. Nobileau, Paris, France, and Bruce J. Watkins, Houston, Tex., assignors to Vetco Gray Inc., Houston, Tex.

Filed Dec. 16, 1988, Ser. No. 286,603
Int. Cl.[5] E21B *23/02, 43/10*
U.S. Cl. 166—382 **8 Claims**

2. A running tool for running a casing hanger and setting a packoff in an annulus between the casing hanger and a wellhead, comprising in combination:

a mandrel having means on an upper end for connection to a string of drill pipe;

a lower body carried by the mandrel;

connection means on the lower body for releasably connecting the lower body to the casing hanger;

an upper body carried by the mandrel above the lower body;

a setting sleeve carried by the upper body and adapted to be releasably connected to the packoff;

means for moving the upper body and setting sleeve from an upper position relative to the casing hanger and lower body to a lower position with the packoff located between the casing hanger and the wellhead by downward movement of the drill string and mandrel after the casing hanger has been cemented in place;

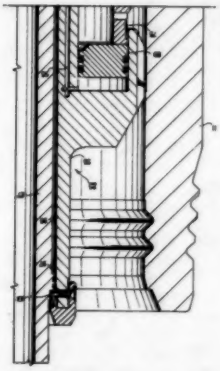
latch means for latching the upper body to the lower body when the lower body is in the lower position, to prevent upward movement of the upper body relative to the lower body;

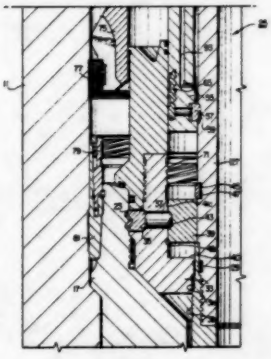
a setting sleeve piston carried in a setting sleeve chamber in the upper body for movement relative to the upper body and positioned to contact an upper end of the setting sleeve;

a mandrel piston carried by the mandrel for movement therewith in a mandrel chamber located between the mandrel and the upper body, the mandrel piston having a smaller pressure area than the setting sleeve piston;

passage means sealed from the annulus and located in the upper body for communicating the mandrel chamber with

the setting sleeve chamber, the mandrel chamber containing an incompressible fluid whereby downward movement of the mandrel piston and mandrel due to downward movement of the drill string after the packoff is in the lower position will increase pressure of the fluid to exert a





downward force on the setting sleeve piston to move the setting sleeve downward to set the packoff; and

release means for releasing the connection means from the casing hanger and the setting sleeve from the packoff to allow the running tool to be retrieved after the packoff has been set.

4,928,770

MECHANICAL MANIPULATION TOOL WITH HYDRAULIC HAMMER

Douglas J. Murray, Tulsa, Okla., assignor to Baker Hughes Incorporated, Houston, Tex.

Filed Feb. 9, 1989, Ser. No. 308,884

The portion of the term of this patent subsequent to May 29, 2007, has been disclaimed.

Int. Cl.[5] E21B *4/14*

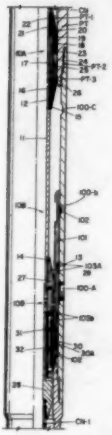
U.S. Cl. 166—385 **4 Claims**

1. An apparatus for introduction into a subterranean well on a continuous length of remedial tubing concentrically insertable through production tubing previously positioned within said well, said production tubing carrying thereon at least one longitudinally manipulatable member, said apparatus comprising:

(1) a cylindricaly tubular housing having a fluid passageway therethrough communicable with the interior of the remedial tubing for transmission of fluid from within the remedial tubing, through the apparatus, and within an auxiliary apparatus carryable within said well by said remedial tubing, and positionable in said well in proximity to one of said longitudnally manipulatable members;

(2) means selectively co-engagable with said longitudinally manipulatable member for manipulating said manipulatable member in at least one direction upon longitudinal manipulation of said remedial tubing; and

(3) hammer means positionable on said apparatus above said



selectively co-engagable means and sealingly engagable around the interior of said longitudinally manipulatable member to prevent the transmission thereacross of fluid in an annular area between the exterior of the apparatus and the interior of the longitudinally manipulatable member and extending to the top of the well, whereby an increase of pressure in said fluid in said annular area will be applied to said hammer means to urge the apparatus to longitudinally reposition the manipulatable member.

4,928,771

CABLE SUSPENDED PUMPING SYSTEM

Joseph E. Vandevier, Claremore, Okla., assignor to Baker Hughes Incorporated, Houston, Tex.

Filed Jul. 25, 1989, Ser. No. 385,208

Int. Cl.[5] E21B *43/00*

U.S. Cl. 166—385 **5 Claims**

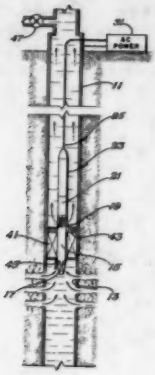
1. In a well having casing containing formation fluid, an improved means for pumping the fluid to the surface, comprising in combination:

a centrifugal pump located within the well;

a submersible three-phase electrical motor located within the well and coupled to the pump for driving the pump;

a cable having a conductor, the cable having a lower end connected to the motor and an upper end extending to the surface, the cable having sufficient strength to support the weight of the pump and motor, allowing the pump and motor to be lowered into and retrieved from the well on the cable;

means for supplying single-phase AC power from the surface down the conductor; and



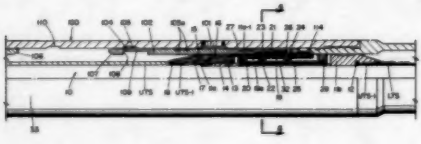
means located at the lower end of the cable for converting the single-phase AC power to three-phase electrical power to power the motor.

4,928,772

METHOD AND APPARATUS FOR SHIFTING A PORTED MEMBER USING CONTINUOUS TUBING

Mark E. Hopmann, Broken Arrow, Okla., assignor to Baker Hughes Incorporated, Houston, Tex.

Filed Feb. 9, 1989, Ser. No. 308,875
Int. Cl.[5] E21B *34/06*
U.S. Cl. 166—386 10 Claims



1. An apparatus for introduction into a subterranean well on a continuous length of remedial tubing concentrically insertable through production tubing previously positioned within said well, said production tubing carrying thereon at least one ported member for selective transmission of fluids between the exterior and interior of the production tubing, each of said ported members receiving means movable in each of opening and closing directions for opening or closing the respective ported member, said apparatus comprising:

(1) a cylindrical tubular housing having a fluid passageway therethrough communicable with the interior of the remedial tubing for transmission of fluid from within the remedial tubing, through the apparatus, and within an auxiliary apparatus carryable within said well by said remedial tubing, and positionable in said well in proximity to one of said ported members; and

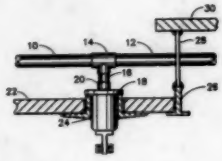
(2) means selectively co-engageable with said opening and closing means for moving said opening and closing means in only one of opening and closing directions.

4,928,773

FIRE SPRINKLER HEAD JIG

Jerry H. White, 27911 Paseo El Concho, San Juan Capistrano, Calif. 92675

Filed Jul. 21, 1989, Ser. No. 384,306
Int. Cl.[5] A62C *37/12*
U.S. Cl. 169—37 12 Claims



1. A sprinkler head jig for substituting for a fire sprinkler head during construction, comprising:

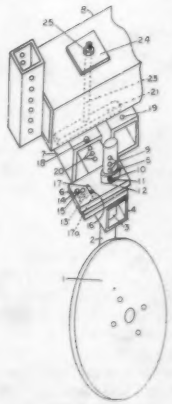
a body having dimensions including a length and outer configuration conforming generally to those of a fire sprinkler head to be installed, and conduit means formed in and along the length of said body and having threads on opposite ends thereof for installing in a sprinkler fitting and for receiving a removable closure, wherein said closure is a cap having marking means thereon for marking a panel engaged thereby for locating a hole for receiving said jig.

4,928,774

CULTIVATOR WITH IMPROVED DISC POSITIONING MEANS

Dennis E. Bell, Brazil, Ind., assignor to Landoll Corporation, Marysville, Kans.

Filed Aug. 4, 1987, Ser. No. 81,331
Int. Cl.[5] A01B *21/08, 71/02*
U.S. Cl. 172—430 11 Claims



1. In an implement for working the earth and cultivating a field which comprises one or more similar carrier units having individual earth-working means disposed thereon, an adjustment means for positioning the individual earth-working means, said adjustment means comprising:

vertical positioning means for supporting and vertically positioning the earth-working means in a definite, fixed position relative to its carrier unit, thereby controlling the depth of penetration into the field;

angular positioning means directly supported by said carrier unit for angularly positioning the earth-working means in

a definite, fixed position relative to the direction of travel of the implement through the field; and

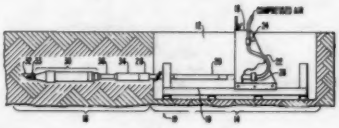
lateral positioning means for laterally positioning the earth-working means in a definite, fixed position relative to its carrier unit, said angular and lateral positioning means each including at least two relatively movable parts, one of which includes a plurality of positioning openings therein to establish a fixed position for the part, the other having a complementary opening adapted to be aligned with one of said positioning openings, a rod-like member insertable through the aligned openings for fixing their positions in alignment, and separate clamping means for firmly holding the relatively movable parts of said angular and lateral positioning means in the selected aligned position.

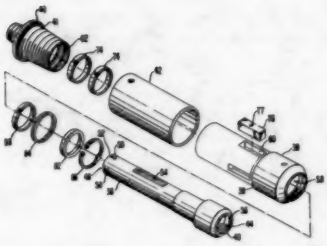
4,928,775

DOWNHOLE SURGE VALVE FOR EARTH BORING APPARATUS

Douglas W. Lee, Enid, Okla., assignor to Gas Research Institute, Chicago, Ill.

Filed Dec. 30, 1988, Ser. No. 292,243
Int. Cl.[5] E21B *4/14, 21/10*
U.S. Cl. 175—19 **3 Claims**





1. In a boring tool assembly having an underground percussion mole boring tool powered by a working fluid, said tool being driven through the earth by a rigid drill string pushed by a drilling frame, and a downhole valve assembly fixed between the downhole end of said drill string and said tool, the improved downhole valve assembly comprising:

a valve spool having an open first end, a closed second end and a peripheral sidewall, an axial bore extending partly through said valve spool from said open first end;

a radial passage adjacent said closed second and of said valve spool, said radial passage extending radially from said valve spool axial bore through said valve spool peripheral sidewall;

an axial groove in said peripheral sidewall of said valve spool;

a valve body having a first end, a second end and a peripheral sidewall, an axial bore extending through the valve body, said valve spool extending through said valve body axial bore so that said second end of said valve body is adjacent said closed second end of said valve spool, said valve spool being axially moveable within said valve body axial bore;

an axial slot through said peripheral sidewall of said valve body, said axial slot positioned adjacent and mating with said valve spool axial groove, and said valve spool axial groove extending axially beyond said valve body axial slot;

a free-floating key element fitting within said valve spool axial groove and said valve body axial slot, said key element having an axial extent less than the axial extent of said valve spool axial groove so that said key element allows said valve spool limited axial movement within said valve body;

a valve housing, said housing having an axial bore therethrough and a peripheral sidewall, said valve body extending through said housing axial bore, said housing peripheral sidewall covering said valve body axial slot to thereby retain said free-floating key element within said valve body axial slot;

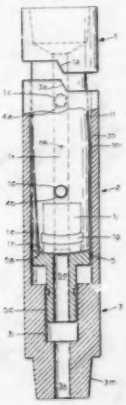
seal means for closing said radial passage in said valve spool when said second end of said valve spool is moved axially towards said first end of said valve body so that working fluid entering said open first end of said valve spool axial bore is effectively prevented from passing out of said valve spool, and for opening said radial passage when said second end of said valve spool is moved axially towards said second end of said valve body so that working fluid entering said open first end of said valve spool is permitted to pass through said radial passage into the axial bore of said valve body and out of said second end of said valve body.

4,928,776

DEVIATION CONTROL TOOL

Thomas E. Falgout, Sr., Rt. 2, Box 11B, Youngsville, La. 70592

Filed Oct. 31, 1988, Ser. No. 264,617
Int. Cl.[5] E21B *7/08*
U.S. Cl. 175—45 **4 Claims**



1. A drilling assembly for use as a segment of a drill string in downhole well drilling applications for deflecting the drill string centerline to select straight hole or directional drilling configuration of a downhole assembly by manipulation of drilling controls at the surface, apparatus comprising:

(a) an elongated body, having a first end and a second end, each end having means for fluid tight attachment to a continuing drill string, with at least one fluid channel to conduct drilling fluid through the length of said body, said body comprising a first portion, having a longitudinal axis, and a second portion, having a longitudinal axis, said two axes being generally concentric when the drilling assembly is in said straight hole configuration;

(b) said first portion comprising said first end and an oppo-

site end with an extension of reduced transverse dimension, and a first shoulder therebetween;

(c) said second portion comprising said second end and an opposite end with a second shoulder and an opening arranged to telescopingly receive said extension for limited axial movement therein between a first position, a corresponding to a minimum overall body length, and a second position, corresponding to a maximum overall body length, for limited rotation about a transverse axis to deflect said axis in said second portion relative to said axis in said first portion;

(d) rotational coupling means comprising non-circular surfaces on each said portions arranged to cooperate to prevent relative rotation therebetween;

(e) cam surfaces on each of said shoulders situated to engage and cooperate to urge said portions in opposite radial directions when said first portion is in said first position;

(f) fulcrum means on said extension, some distance from said first shoulder arranged to engage said second portion to deflect said axis in said first portion from said axis in said second portion when said first portion is in said first position;

(g) a plurality of sprockets in the wall of said opening with each socket opening radially inward therefrom;

(h) four lock bolts, each situated to operate as fluid power pistons in a transverse bore in said extension and to extend therefrom to engage said sockets, two of which extend in generally opposite radial directions from the other two and arranged such that two of said lock bolts engage said sockets when said second portion is in one of said first or said second positions and four said lock bolts engage said sockets when said second portion is in the other of said first or said second positions; and

(i) fluid communication means between said channel and said bores such that fluid pressure in said channel will urge said lock bolts radially therefrom.

4,928,777

CUTTING ELEMENTS FOR ROTARY DRILL BITS

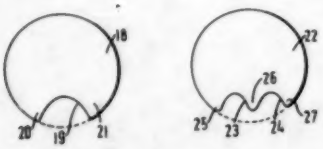
David N. Shirley-Fisher, Cheltenham, England, assignor to NL Petroleum Products Limited, Gloucestershire, England

Continuation of Ser. No. 808,325, Dec. 12, 1985, abandoned. This application Nov. 5, 1987, Ser. No. 120,718

Claims priority, application United Kingdom, Dec. 22, 1984, 8432587

Int. Cl.[5] E21B *10/46*

U.S. Cl. 175—329 **8 Claims**



1. A rotary well drill bit comprising a bit body having an end face, a shank for connection to a drill string, an inner channel for supplying drilling fluid to said face and a plurality of cutting elements carried at various radial distances from the centerline of the bit body on said end face, at least some of said cutting elements each comprising a tablet having a front face, a rear face and a peripheral edge, said tablet including a front cutting layer of superhard material defining said front face, said front cutting layer bonded to a less hard backing layer defining said rear face, the front layer being continous and coextensive with the backing layer along the peripheral edge, and said peripheral edge of said tablet being formed with at least two re-entrant portions which define between them a projecting cutting portion comprised of continous coextensive projecting portions of both said layers; and wherein the radius of the end face of the bit body is several times larger than the maximum transverse dimension of the front face of one of said cutting elements.

4,928,778

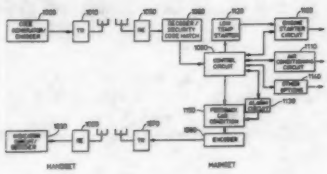
REMOTE CONTROL CAR STARTER

Joshua K. Tin, Scarborough, Canada, assignor to Remote Automation & Control Electronics Inc., Scarborough, Canada

Filed Dec. 11, 1987, Ser. No. 131,998

Int. Cl.[5] F02N *11/08*

U.S. Cl. 180—167 **34 Claims**



1. A system for remotely controlling a component of a vehicle, the system comprising a remote controller operable by a user, and a mainset mounted at any suitable location on the vehicle, to be controlled by said remote controller, wherein said remote controller includes:

(a) remote controller code generating means for generating a remote controller command code for controlling the vehicle component, said command code having a characteristic;

(b) remote controller transmission means, responsive to said remote controller code generating means, for transmitting said remote controller command code to said mainset;

(c) remote controller reception means for receiving a feedback code transmitted from said mainset, indicative of the condition of the vehicle component controlled in accordance with said command code;

(d) remote controller indicator means, responsive to said remote controller reception means and to said transmitted feedback code, for providing the user an indication correlatable with said transmitted feedback code;

and wherein said mainset includes

(a) mainset reception means for receiving said command code transmitted from said remote controller transmission means;

(b) mainset security means, responsive to said mainset reception means, having a mainset characteristic, for producing a verification that said command code characteristic matches said mainset characteristic;

(c) mainset implementation means, responsive to said verification and said mainset reception means, and coupled to the vehicle component, for implementing the control function on the vehicle component in accordance with said command code;

(d) mainset feedback means, coupled to the vehicle component, for generating said feedback code indicative of the condition of the vehicle component following the implementation of said command code; and

(e) mainset transmission means, responsive to said mainset feedback means, for transmitting said feedback code to said remote controller reception means, said mainset feedback means having means for generating said feedback code with a characteristic and said remote controller having security means, responsive to said remote controller reception means and coupled to said remote controller indicator means, said remote controller security means having (i) a remote controller characteristic, (ii) means for producing a verification that said transmitted feedback code characteristic matches said remote controller characteristic, and (iii) means for rendering said remote con-

troller indicator means unresponsive to said transmitted feedback code if there is no verification.

4,928,779

VEHICLE SPEED CONTROL DEVICE

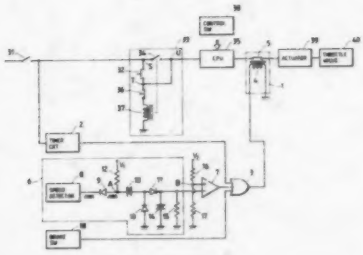
Kazuhiko Yamada, Aichi, Japan, assignor to Kabushiki Kaisha Tokai Rika Denki Seisakusho, Aichi, Japan

Filed Aug. 9, 1988, Ser. No. 230,100

Claims priority, application Japan, Aug. 13, 1987, 62-124154[U]

Int. Cl.[5] B60K *31/02*

U.S. Cl. 180—178 **9 Claims**



1. A vehicle speed control device for maintaining a substantially constant speed travelling of a vehicle, comprising:

a main switch circuit for enabling and disabling the constant speed travelling;

control signal means for providing a control signal for said constant speed travelling, provided the main switch circuit is enabled;

an actuator responsive to the control signal means for initiating the constant speed travelling in response to the control signal and thereafter adjusting the travelling speed to be substantially constant;

interruption means coupled to the actuator for inhibiting the constant speed travelling; and

a timer circuit coupled to the interruption means for effecting the inhibiting for a predetermined time period after the operation of an ignition switch of the vehicle has commenced.

4,928,780

SPEED CONTROL APPARATUS WITH COMPENSATION FOR ACTUATOR LINK PLAY

Tetsuya Tada, Anjyo, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Apr. 11, 1989, Ser. No. 336,327

Claims priority, application Japan, Apr. 20, 1988, 63-98994

Int. Cl.[5] B60K *31/02*

U.S. Cl. 180—179 **7 Claims**

1. An automatic speed control apparatus for vehicles comprising:

an actuator for opening and closing a throttle valve independently of an accel pedal;

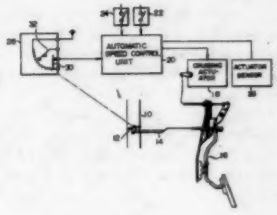
a link for connecting said throttle valve and said actuator;

a means for detecting the amount of idle working of said actuator caused by the play of said link when said throttle valve is opened by said actuator;

a speed sensor for detecting the vehicle speed;

a speed control means for controlling said actuator so that the vehicle speed from said speed sensor is maintained at a predetermined speed; and

a means for setting the amount of offset working by adding the amount of idle working detected by said means for detecting the amount of idle working to the amount of control of said speed control means as an amount of offset



working in the direction in which said throttle valve is opened.

4,928,781

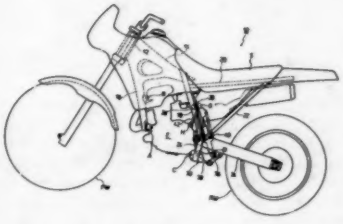
REAR WHEEL SUSPENSION DEVICE FOR VEHICLES OF SMALL SIZE

Shizuo Kawano, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 3, 1988, Ser. No. 201,865

Int. Cl.[5] B62K *25/20*

U.S. Cl. 180—227 **5 Claims**



1. A vehicle comprising:

a body frame;

longitudinally spaced front and rear wheels and an engine therebetween;

a rear fork pivotally mounted at its front end to said body frame and rotatably supporting said rear wheel at its rear end;

a damper connecting between said rear fork and said body frame; and

a suspension device including an auxiliary frame connecting at one end said damper with said body frame and at its other end to another position on said vehicle, wherein said auxiliary frame and said damper are coaxially pivotably connected to said body frame.

4,928,782

MOTOR VEHICLE COMPRISING TWO DRIVEN AXLES

Hans D. Sommer, Graz, Austria, assignor to Steyr-Daimler-Puch AG, Vienna, Austria

Filed Nov. 21, 1988, Ser. No. 274,446

Claims priority, application Austria, Nov. 23, 1987, 3072/87

Int. Cl.[5] B60K *17/354*

U.S. Cl. 180—244 **9 Claims**

1. A motor vehicle comprising

first and second axles,

a motor connected to and driving said first axle,

an accelerator pedal for controlling said motor,

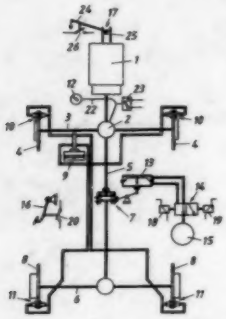
a power train connecting said motor to said second axle and driving same,

disconnecting clutch means incorporated in said power train for disconnecting said second axle from said motor, said disconnecting clutch means being a mechanically actuated positive clutch,

mechanical actuation means connected mechanically to said disconnecting clutch means for disengaging and re-engaging said disconnecting clutch means,

braking means comprising a brake pedal operative to actuate said braking means,

a clutch control connected to said mechanical actuation means and including first switching means responsive to actuation of said braking means, second switching means responsive to actuation of said accelerator pedal, third



switching means responsive to vehicle speed, means responsive to said first switching means for causing said mechanical actuation means to disengage said disconnecting clutch means in response to actuation of said braking means, and means responsive to said first and third switching means for causing said mechanical actuation means to re-engage said disconnecting clutch in response to release of said brake pedal when said vehicle speed is above a predetermined threshold.

wherein said clutch control comprises means responsive to said first and third switching means for causing said mechanical actuation means to disengage said disconnecting clutch means only when said vehicle speed is above a second predetermined threshold.

4,928,783

WELL BOREHOLE SOUND SOURCE

Troy N. Crook, Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.

Filed May 22, 1989, Ser. No. 355,233

Int. Cl.[5] G01V *1/00*

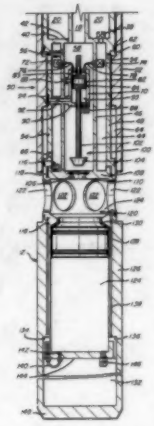
U.S. Cl. 181—106 **35 Claims**

18. A method of forming acoustic pulses in drilling fluid in a well borehole, comprising the steps of:

storing a charge of drilling fluid in a chamber in a body member in the well borehole;

increasing the pressure in the well borehole to arm a shuttle member adjacent the chamber with a gas compressed in part by means internal to said body member;

firing the shuttle member; and



displacing the charge of drilling fluid from the chamber into the well borehole.

4,928,784

ANTI-BOUNCE DEVICE FOR PREVENTING THE MULTIPLE SHOCKS OF A MOVING MASS AFTER A FIRST IMPACT AGAINST ANOTHER ELEMENT

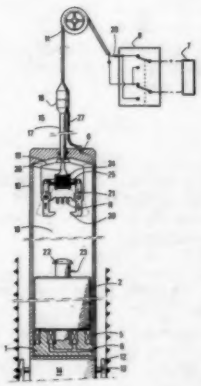
Patrick Meynier, Chatou, France, assignor to Institut Fancais du Petrole, Rueil-Malmaison, France

Filed May 11, 1989, Ser. No. 350,166

Claims priority, application France, May 11, 1988, 88 06425

Int. Cl.[5] G01V *1/40*

U.S. Cl. 181—106 **12 Claims**



2. An anti-bounce device for preventing multiple bouncing of a moving mass upon a first impact of the moving mass against a fixed target element in contact with geological formations, the device comprising magnetic means for exerting a magnetic attractive force on the moving mass in an axial direction of the moving mass, and means for selectively actuating the magnetic means so as to apply the attractive force against the moving mass to hold the moving mass against the target

element and prevent the moving mass from bouncing off the target element upon the first impact of the moving mass against the target element.

4,928,785

FULL FLOW SOLENOID VALVE FOR AIR GUN OPERATION

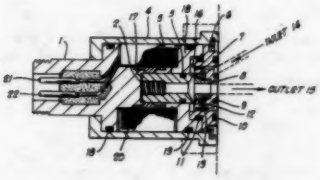
Earnest R. Harrison, Plano, Tex., assignor to Halliburton Geophysical Services, Inc., Houston, Tex.

Continuation of Ser. No. 87,003, Aug. 18, 1987, Pat. No. 4,825,973. This application Dec. 22, 1988, Ser. No. 289,949

The portion of the term of this patent subsequent to May 2, 2006, has been disclaimed.

Int. Cl.[5] H04R *1/02*

U.S. Cl. 181—120 **4 Claims**



1. A valve assembly for controlling the actuation of a seismic energy source, comprising:

a valve housing;

first fluid port means for communicating fluid with said valve assembly, said first fluid port means including a nose portion defining an annular chamber within said housing;

second fluid port means for communicating fluid with said valve assembly, said second fluid port means including a seal retainer having a hollow center portion coaxial with said annular chamber within said housing, said seal retainer connected to said nose portion;

an annular face seal disposed between and adjacent to both said nose portion and said seal retainer;

a reciprocable annular plunger including a cylindrical outer surface terminating at a forward annular sharp edge, said plunger disposed in said housing for movement relative to said nose portion, said seal retainer and said face seal so that said edge engages and disengages said face seal to isolate and communicate said annular chamber and said hollow center portion along a 360° port opening; wherein in response to said edge engaging said face seal, said 360° port opening is closed with a portion of said cylindrical outer surface adjacent said annular chamber; and wherein in response to said edge disengaging said face seal, said 360° port opening opens so that flow rate of fluid through said 360° port opening begins immediately and increases linearly with plunger displacement by which said edge disengages said face seal; and

plunger actuation means within said housing for selectively effecting said plunger displacement of said plunger.

4,928,786

SELF-SEALING DUAL STETHOSCOPE HEAD

Derek R. Allen, 30994 Steeplechase Dr., San Juan Capistrano, Calif. 92675

Filed Apr. 20, 1989, Ser. No. 340,667

Int. Cl.[5] A61B *7/02;* **H04R** *25/00*

U.S. Cl. 181—137 **17 Claims**

1. A self-sealing dual stethoscope head comprising:

a low frequency sound receiving bell;

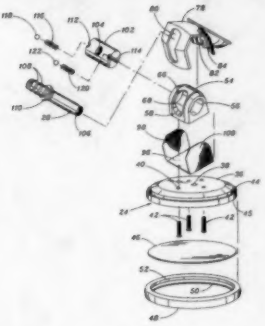
a high frequency sound receiving diaphragm;

a selectively movable valve assembly comprising a valve housing having a cylindrical bore valve seat having an axis and an interior surface;

a first acoustical passage within said valve housing which opens into said interior surface of said cylindrical bore for sound communication with said bell;

a second acoustical passage within said valve housing which opens into said interior surface of said cylindrical bore for sound communication with said diaphragm;

a substantially cylindrical valve having an axis, two ends, and an exterior surface, said valve being seated within said cylindrical bore and having a channel therein for selective alignment and sound communication with said first acoustical passage or with said second acoustical passage upon rotation of said cylindrical valve within said cylindrical bore;



means connected to said cylindrical valve for selectively moving said cylindrical valve between said first and said second acoustical passages; and,

said substantially cylindrical valve comprising a first lengthwise accurate segment which has a radius sized to conform with and closely contact said interior surface of said cylindrical bore; and, said cylindrical valve further comprising a second lengthwise accurate segment which has a radius sized to avoid close contact with said interior surface of said cylindrical bore.

4,928,787

MOBILE SPEAKER SYSTEM

Toshifumi Kato, Yamagata, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Apr. 25, 1989, Ser. No. 342,825

Claims priority, application Japan, Aug. 26, 1988, 63-111828[U]; Aug. 26, 1988, 63-111829[U]

Int. Cl.[5] H05K *5/00*

U.S. Cl. 181—141 **19 Claims**

1. A mobile speaker enclosure system for enclosing at least one speaker unit suited for mounting on a rear parcel tray attachment portion of a vehicle, the speaker enclosure system comprising:

a bottom casing elongated in a direction of a width of said vehicle;

an upper casing mounted over said elongated bottom casing so as to form a speaker enclosure cabinet for enclosing said at least one speaker unit, said bottom casing having a plurality of first selective support ribs projecting in a first direction, and a plurality of second selective support ribs

projecting in a second direction which is substantially perpendicular to the first direction; and

fixing metal fittings selectively attachable to at least one of said selective support ribs so as to increase a rigidity of said bottom casing along said at least one of said selective support ribs and prevent shape transformation of said bottom casing.

4,928,788

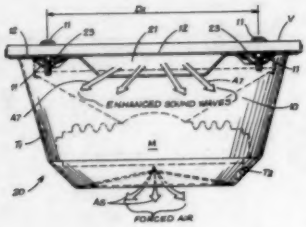
PORTED AUTOMOTIVE SPEAKER ENCLOSURE APPARATUS AND METHOD

Jon B. Erickson, 112 Kaibab Way, Cochise, Ariz. 85606

Filed Jun. 12, 1989, Ser. No. 364,160

Int. Cl.[5] H05K *5/00*

U.S. Cl. 181—141 **11 Claims**



1. A speaker enclosure apparatus for enclosing a speaker having a flexible cone member of an audio system and enhancing sound fidelity of said audio system, said apparatus comprising:

a concave body having a rim portion and a convex bottom;

first sound fidelity enhancement means for directing sound waves to a listening compartment, said first sound fidelity enhancement means comprising an open duct port disposed on said rim portion;

second sound fidelity enhancement means for controlling movement of said cone member of said speaker, said second sound fidelity enhancement means comprising an opening at an apex of said convex bottom that controls compressed air being exhausted from said concave body and corresponding to back pressure on said cone member that controls movement of said cone member, said opening also enabling convection cooling of said speaker; and

a plurality of third sound fidelity enhancement means for equalizing sound wave pressure emanated from said speaker, said plurality of third sound fidelity enhancement means comprises a plurality of perimeter disposed U-shaped notches on said rim portion adjacent said first sound fidelity enhancement means.

4,928,789

IRON WORKER'S SEAT PROTECTOR AND GRIPPING DEVICE

Shane C. Claeys, 3036 N. 97th St., Omaha, Nebr. 68134

Filed Apr. 3, 1989, Ser. No. 331,951

Int. Cl.[5] A62B *35/00*

U.S. Cl. 182—3 **6 Claims**

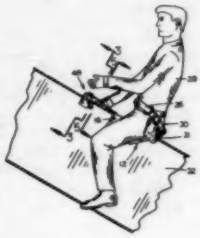
1. An iron worker's seat protector and gripping device, comprising,

an elongated flexible safety belt for attachment to the user's waist,

connecting strap means removably connected to said belt so as to normally hang downwardly therefrom,

a substantially flat, flexible sheet member connected to said connecting strap, one surface of said sheet member having a gripping surface provided thereon,

said connecting strap having a length sufficient so that said sheet member normally hangs downwardly therefrom below the user's rump and so that the user may pull the lower end



thereof upwardly and forwardly to position the sheet member on a beam between the user's legs to enable the user to apply gripping pressure to the sides of the beam with his legs.

4,928,790

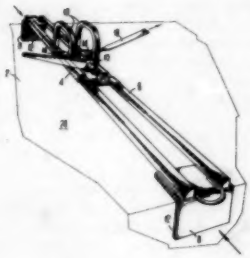
RESTRAINING DEVICE

Jerry L. Franks, Hanahan, S.C., assignor to South Carolina State Ports Authority, Charleston, S.C.

Filed Jul. 17, 1989, Ser. No. 380,515

Int. Cl.[5] A62B *35/00*

U.S. Cl. 182—3 **9 Claims**



1. A restraining device comprising:

a. an anchorage whose length may be expanded and contracted, so as to cause each end of said anchorage to apply pressure to a work surface when the length of said anchorage is contracted, and to release said anchorage from said work surface when said length of said anchorage is expanded;

b. actuation means for contracting the length of said anchorage and expanding the length of said anchorage;

c. one or more restraining lines and means for removably attaching said restraining lines to said anchorage; and

d. one or more safety harnesses worn by one or more workers to which an end of said restraining line opposite said anchorage is removably attached.

4,928,791

ROPE CLIMBER

Chie F. Hong, 4F, No. 45, Lane 289, Hsin Tai Road, Hsin Chuang City, Taipei Hsien, Taiwan

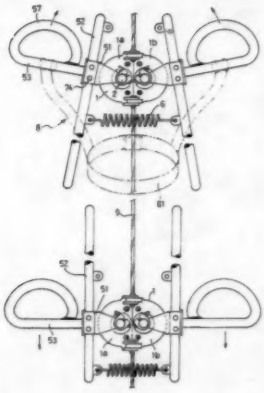
Filed Aug. 22, 1989, Ser. No. 396,618

Int. Cl.[5] A63B *27/00*

U.S. Cl. 182—135 **11 Claims**

1. A rope climber hanging fastenedly in pair on a steel cable, a rope or a long pole suspending in the air and by alternating operation by hand and foot enabling a person's body to be

lifted up or lowered down by the rope and to stop at any position on the cable or rope, characterized by that said rope climber includes in pair grooved wheels having the outer circumferences in close contact and capable of rotating towards the opposite direction, one or both of said grooved wheels having on the middle of the outer circumferences provided by engraving with cam paths eccentric grooves or ring grooves of unequal diameter, said grooved wheels formed



at the close contact point of the outer circumferences with a hole capable of slipping through the abovesaid cable or rope, and following rotation of said grooved wheels said hole being capable of varying its size, whereby said rope climber is able to slide up and down by the cable or rope when said hole has become large in size and to hold the cable or rope in between tightly and stay at any fixed place on the latter without being concerned about it being slid down when said hole has become small.

4,928,792

JOINT FOR LADDERS

Gunther Krause, Alsfeld, Fed. Rep. of Germany, assignor to Krause Werk GmbH & Co. KG, Fed. Rep. of Germany

Filed Nov. 4, 1988, Ser. No. 267,147

Claims priority, application Fed. Rep. of Germany, Nov. 4, 1987, 3737295

Int. Cl.[5] **F16C** *11/00;* **E06C** *7/50*

U.S. Cl. 182—163 **9 Claims**

1. An improved joint for connecting the uprights of a foldable multipurpose ladder, comprising:

first and second joint elements pivotable around a common axis, each element consisting of left and right halves secured together with said first joint element being located between the halves of said second joint element;

detent-receiving grooves formed on the circumference of said first joint element, and distributed in accordance with the operating positions of said ladder, whereby said first joint element comprises a double shell detent wheel;

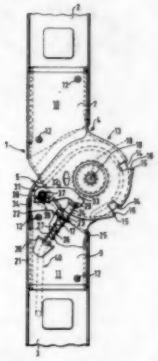
detent means mounted within said second joint element and movable into and out of engagement with a selected one of said grooves;

first and second bores coaxially formed in the left and right halves of said second joint, said first and second bores including aligned curved recesses;

a release lever including a pair of spaced, parallel arms having first ends and second ends, said first ends including means mounting said release lever for pivotal motion in said first and second bores of said second joint element and said second ends engaging said detent means whereby pivotal motion of said release lever will retract said detent means out of a groove in said detent wheel, said means mounting said release lever including first and second protrusions extending from said release lever into corresponding bores in first and second halves, respectively, of said second joint element, said protrusions having generally cylindrical coaxial apertures and including radially extending shoulder portions forming offset recesses in said apertures, said protrusions forming bearings for said release lever to permit pivotal motion of said release lever in said bores with said shoulder portions of said protrusions extending into, and movable in, said curved recesses;

eccentrically located bar means interconnecting said first ends of said release lever arms;

slot means in said bar means;



an operating lever for pivoting said release lever to lift said detent means, said operating lever including a shaft portion external to said joint elements and an elbow portion including a key bit having a cam, said key bit extending into said coaxial aperture of one of said protrusions, through said release lever, and into the coaxial aperture of the other of said protrusions with said cam engaging said offset recesses thereof and engaging said slot means in said bar between said release lever arms, whereby rotation of said operating lever rotates said key bit and cam to thereby rotate said release lever, and wherein said curved recesses limit the rotational motion of said protrusions to thereby limit the rotation of said release lever.

4,928,793

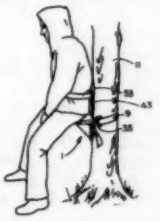
RIGID TREE SEAT

Anthony J. Westimayer, N6585 St. Helena Rd., and Gary Spettel, 118 South Palmatory St., both of Horicon, Wis. 53032

Filed May 25, 1989, Ser. No. 356,940

Int. Cl.[5] **A45F** *3/26;* **A01M** *31/02*

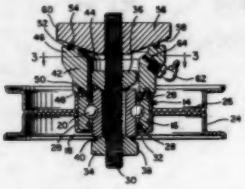
U.S. Cl. 182—187 **21 Claims**



1. A rigid tree seat comprising:

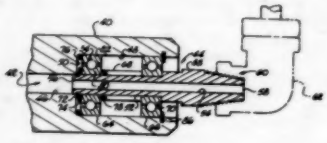
a. a frame comprising:
i. a seat portion; and
ii. rib means depending from the seat portion and joined thereto;
b. covering means for removeably covering the frame; and
c. strap means passing through the frame and covering means for releaseably securing the frame to a selected support.

4,928,794
SEALED BEARING LUBRICATOR
Timothy W. Bangerger, P.O. Box 119, Leoti, Kans. 67861
Filed May 4, 1989, Ser. No. 347,019
Int. Cl.[5] F16C *1/24*
U.S. Cl. 184—5.1 **11 Claims**



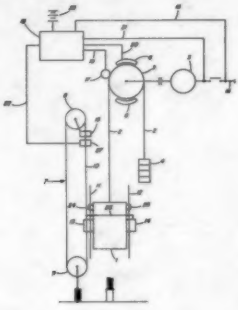
1. A sealed bearing lubricator comprising an externally threaded bolt adapted to extend through an inner race of a sealed bearing, spaced nuts threadedly engaged with the bolt and engaging the ends of the inner race of the sealed bearing to mount the bolt rigidly with respect to the sealed bearing, a cylindrical member mounted on the bolt in enclosing relation to one of the nuts and in sealed relation to the sealed bearing, a retaining nut on the bolt threadedly engaged therewith and engaged with the outer end of the cylindrical member to retain the cylindrical member against the sealed bearing, and pressurized lubricant introduction means in the cylinder to pressurize the interior of the cylinder with lubricant to force lubricant past an external seal on the sealed bearing.

4,928,795
LUBRICATION APPARATUS
Joseph J. Maloney, Hartsville, Ind., assignor to Reliance Electric Company, Greenville, S.C.
Filed Feb. 16, 1988, Ser. No. 156,425
Int. Cl.[5] F16N *27/00*
U.S. Cl. 184—7.4 **21 Claims**



1. A lubrication apparatus for supplying lubrication to a main shaft supporting rotatable members thereon for lubricating such rotatable members, said apparatus comprising:
a lube shaft for the passage of lubricant therethrough, having a central bore and respective input and output ends interconnected by said central bore, said lube shaft adapted for being received within the bore of a main shaft supporting rotatable members thereon to be lubricated; and
bearing means for rotatably supporting said lube shaft in a bore of a main shaft with said lube shaft input end remaining accessible for the application of grease thereto, whereby grease so applied may traverse said central bore for application to the main shaft upon exiting said lube shaft output end.

4,928,796
LIFT
Otto L. Poon, 17th Floor, Java Centre, 124-134 Java Road, North Point, Hong Kong
Filed Jun. 15, 1988, Ser. No. 207,179
Claims priority, application United Kingdom, Nov. 25, 1987, 8727634
Int. Cl.[5] B66B *5/16*
U.S. Cl. 187—89 **25 Claims**



1. A lift apparatus comprising a lift, means for raising and lowering the lift, a first brake actuable to prevent movement of the lift, means for detecting actuation of said means for raising and lowering, movement detecting means for detecting a movement of the means for raising and lowering when the first brake is actuated, guide means for directing the lift, a second brake actuable to prevent movement of the lift by acting on the guide means, and control means responsive to at least said means for detecting actuation of said means for raising and lowering and said movement detecting means for actuating the second brake when movement of the lift is detected by the movement detecting means, so that the second brake stops slippage of the lift when the first brake is actuated, the means for raising and lowering the lift is stopped, and the lift is moving.

4,928,797
BRAKE
Anthony W. Harrison, Birmingham, Great Britain, assignor to Lucas Industries Public Limited Company, Birmingham, England
Filed Nov. 17, 1988, Ser. No. 272,385
Claims priority, application United Kingdom, Jan. 19, 1988, 8801089
Int. Cl.[5] F16D *65/27*
U.S. Cl. 188—156 **20 Claims**

1. A brake comprising:
a housing;
a friction element supported on said housing;
slave cylinder-piston means supported by said housing in engagement with said friction element and operable to engage said friction element with a member to be braked;
an actuator for operating said slave cylinder-piston means having a hydraulic pressure generating device connected to said slave cylinder-piston means for producing a brake-applying force in both dynamic and static braking modes 2; and
an electrical stepper motor for driving said hydraulic pressure generating device, said hydraulic pressure generating device comprising,

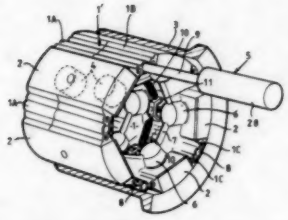
a pressure generating cylinder,

a pressure generating piston axially reciprocable in said pressure generating cylinder,

a screw rotatable by said stepper motor;

a helical ball race connected to said pressure generating piston,

a nut mounted in said helical ball race and engaged with said screw, and,



a torsion spring rotationally restraining said nut, so that said torsion spring restrains said nut against rotation during initial take up of brake clearances upon actuation of said pressure generating piston, but yields upon application of a predetermined braking load applied by said friction element on the member to be braked causing said nut to rotate in said helical ball race to increase the braking load.

4,928,798

DISC FOR DISC BRAKES

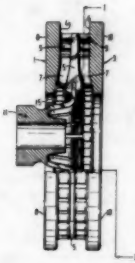
John C. Watson, Ness; Stephen P. Gaskill, Liverpool; David F. Russell, Hoole, all of England, and Robert L. D. Burns, Colwyn Bay, Wales, assignors to Lucas Industries public limited company, Birmingham, England

Filed Feb. 6, 1986, Ser. No. 826,630

Claims priority, application United Kingdom, Feb. 6, 1985, 8502954

Int. Cl.[5] F16N *65/10*

U.S. Cl. 188—218 XL **10 Claims**



1. A disc for a disc brake comprising two annular members arranged coaxially with respect to each other and with respect to a central hub, a central web radiating from the central hub and extending between said annular members, generally radially extending vanes projecting from each side of the central web and interconnecting said central web with each said annular member , and pillars separate and distinct from said vanes and also projecting from each side of the central web and interconnecting said central web with each said annular member, said vanes extending for part of the radial extent of said annular members, and each of said pillars having a radial extent less than said vanes and being located in a radial region not occupied by said vanes.

4,928,799

HYDRAULIC DASHPOT

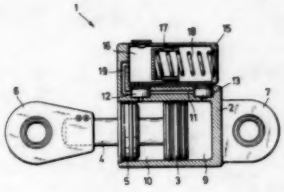
Lothar Zschiesche, Godenstedt, Fed. Rep. of Germany, assignor to LISEGA GmbH, Fed. Rep. of Germany

Filed May 15, 1989, Ser. No. 351,619

Claims priority, application Fed. Rep. of Germany, May 18, 1988, 3816821

Int. Cl.[5] F15B *15/22*; F16L *3/24*

U.S. Cl. 188—314 **14 Claims**



1. A hydraulic dashpot comprising a cylinder, a piston separating said cylinder into a pair of chambers, a rod connected to said piston and projecting outwardly of said cylinder, means for defining a storage chamber for compensating fluid, passage means for conducting compensating fluid between said storage chamber and said pair of chambers, first valve means in said passage means for controlling fluid flow between said passage means and at least one of said pair of chambers, a first valve body accommodating said first valve means, and second valve means immediately upstream of said first valve body for closing fluid flow through said passage means in a direction away from said storage chamber in automatic response to the removal of said first valve body from said passage means wherein the first valve means be removed and repaired, if necessary, without affecting the integrity of the storage chamber.

4,928,800

STEERING HANDLE FOR LUGGAGE CASE

Stephen T. Green, Oxford, England, and Willibald Van Hoye, Zwijnaarde, Belgium, assignors to Samsonite Corporation, Denver, Colo.

PCT No. PCT/GB85/00399, § 371 Date May 5, 1986, § 102(e) Date May 5, 1986, PCT Pub. No. WO86/01384, PCT Pub. Date Mar. 13, 1986

PCT Filed Sep. 6, 1985, Ser. No. 866,200

Claims priority, application European Pat. Off., Sep. 6, 1984, 84306083.1

Int. Cl.[5] A45C *13/00*

U.S. Cl. 190—115 **8 Claims**

1. A luggage case comprising a shell, a steering handle for

steering the case when it is being rolled on the ground, means for pivotally mounting the steering handle for pivotal movement between a first closed position in which the handle lies adjacent the shell and a second extended position in which the handle projects at a predetermined angle from the shell, the pivotal movement of the handle being limited at the second position by means of a stay connected at one end to the steering handle at a position spaced from the means for pivotally mounting towards the free end of the handle and at the other end to the shell, the stay being of resilient flexible material, and means for holding the stay in a flexed condition when the handle is in the first position whereby, when in said flexed condition, said stay exerts a force on the handle tending to hold the handle in the first position.

4,928,801

SELF-CENTERING FREEWHEEL MECHANISM

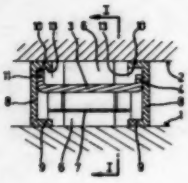
Jean M. Laurent, Villebon sur Yvette, France, assignor to SKF France, Clamart, France

Filed Jun. 17, 1988, Ser. No. 207,852

Claims priority, application France, Jul. 15, 1987, 87 09955

Int. Cl.[5] F16D *41/07*

U.S. Cl. 192—45.1 **10 Claims**



1. Self-centering freewheel mechanism comprising at least one cage, wedging cams in said at least one cage, U-shaped bearings having inner and outer branches oriented towards said at least one cage, and fastening means for fastening said cage to both of said bearings to prohibit movement of said bearings in an axial direction, said fastening means including a plurality of circumferentially spaced radial protuberances on said at least one cage, said radial protuberances bearing elastically against at least one of said branches of each bearing facing towards the inside of the U-shape to fasten said at least one cage and said bearings together in the axial direction.

4,928,802

OVERLOAD RELEASE CLUTCH FOR THE TRANSMISSION OF ROTARY MOVEMENT BETWEEN SHAFTS

Hermann Weiss, and Rudolf Weiss, both of Vreden, Fed. Rep. of Germany, assignors to ATEC-Weiss KG, Vreden, Fed. Rep. of Germany

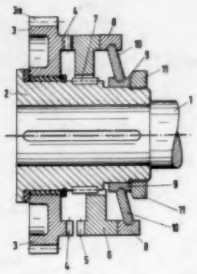
Filed Jun. 1, 1989, Ser. No. 359,610

Claims priority, application Fed. Rep. of Germany, Jun. 8, 1988, 3819481

Int. Cl.[5] F16D *23/00*

U.S. Cl. 192—56 R **8 Claims**

1. An overload release clutch for the transmission of rotary movements between shafts, having two axially disengageable clutch halves borne by a hub and the other clutch half being rigidly connected axially to the hub, a spring arrangement being provided which has a snap-over characteristic and which acts with an adjustable axial force on the axially movable clutch half in the engaged state, the spring arrangement consisting of a concentric ring connected to the axially movable clutch half, and radially directed bearing elements which are pivotably disposed at an inclination to the axial plane of the clutch on the ring and the hub disposed at a radial distance inside the ring, wherein the bearing elements are rigid and the ring is so resilient that, when acted upon with an axial force



directed towards the direction of inclination of the bearing elements, the ring can be radially expanded.

4,928,803

POWER TRANSMISSION APPARATUS

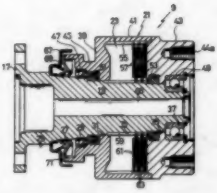
Osamu Ishikawa, and Kazuyoshi Watanabe, both of Tochigi, Japan, assignors to Tochigifujisangyo Kabushiki Kaisha, Tochigi, Japan

Filed Feb. 27, 1989, Ser. No. 316,287

Claims priority, application Japan, Mar. 1, 1988, 63-45746

Int. Cl.[5] F16D *31/00*

U.S. Cl. 192—58 B **2 Claims**



1. A power transmission apparatus comprising:

(a) a multistep shaft formed with a first connecting portion at a first end thereof and multistep shoulder portions successively reduced in diameter toward a second end thereof opposite to the first end, two sealing members being disposed at two inwardly formed multistep shoulder portions and two bearing members being disposed at two outwardly formed multistep shoulder portions, respectively;

(b) a casing fitted to said shaft from the second end thereof, with the sealing members and the bearing members interposed between the multistep shoulder portions of said multistep shaft and said casing, aid casing being formed with a second connecting portion near the second end of said multistep shaft, a working chamber being formed between said multistep shaft and said casing so as to be filled with viscous fluid;

(c) a plurality of first resistance plates engaged with and arranged axially along a portion of said multistep shaft within the working chamber; and

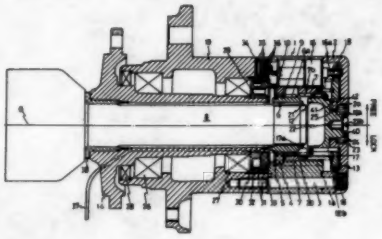
(d) a plurality of second resistance plates engaged with and arranged axially along a portion of said casing within the working chamber, said first and second resistance plates being alternately arranged with respect to each other.

4,928,804

FREE WHEEL HUB CLUTCH

Hideaki Wakabayashi, Nagoya, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Feb. 24, 1989, Ser. No. 315,160
Claims priority, application Japan, Feb. 29, 1988, 63-046386
Int. Cl.[5] F16D *1/06*; B60K *23/08*
U.S. Cl. 192—83 **3 Claims**



1. A free wheel hub clutch for an axle shaft, comprising:
an outer casing;
inner sleeve means in the casing for connection to the axle shaft;
slidable clutch means in the casing for selecting alternating movement between a lock position wherein the clutch means is connected with the inner sleeve means, and a free position wherein the clutch means is disconnected from the inner sleeve means for free rotation with respect thereto; and
manual operating means for manually alternating the movement of the clutch means between the lock position and the free position;
remote operating mans for remotely alternating the movement of the clutch means between the lock position and the free position.

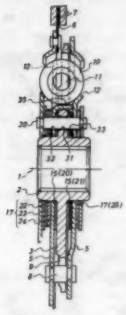
4,928,805

FRICTION DEVICE IN A DAMPER DISK

Hiroshi Takeuchi, and Yoshinari Yoshimura, both of Neyagawa, Japan, assignors to Kabushiki Kaisha Daikin Seisakusho, Osaka, Japan

PCT No. PCT/JP88/00562, § 371 Date Feb. 6, 1989, § 102(e) Date Feb. 6, 1989, PCT Pub. No. WO88/10375, PCT Pub. Date Dec. 29, 1988
PCT Filed Jun. 10, 1988, Ser. No. 350,581
Claims priority, application Japan, Jun. 15, 1987, 62-91797[U]
Int. Cl.[5] F16D *3/14*
U.S. Cl. 192—106.2 **1 Claim**

1. A friction device of a damper disk comprising:
a hub provided with a flange which is an output member;
a pair of annular side plates, which are input members and are disposed at opposite sides of said flange;
springs disposed in openings in said side plates and said flange for circumferentially connecting said side plates to said flange;
a pair of annular sub-plates disposed around said hub with said side plates and said flange therebetween;
first friction mechanisms disposed radially inside said openings and between said side plates and said flange, respectively;
second friction mechanisms disposed between said side plates and said plates, respectively, said second friction mechanisms being adapted to cause a friction force by relative rotation between said side plates and said sub-plates which is larger than the friction force caused on said first friction mechanism by relative rotation between said side plates and said flange;
stud pins extending in an axial direction of the disk and rigidly connecting said both of the sub-plates together;
stop mechanism for preventing relative rotation between said flange and said sub-plates over a predetermined angle; and



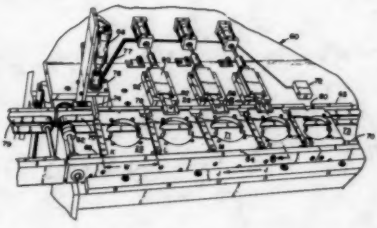
bent portions formed at radially inner edges of said openings in one of said side plates and extending axially toward the other of said side plates, said bent portions passing through said openings in said flange with an outer end of each of said bent portions in contact with an inner surface of said other side plate.

4,928,806

SYSTEM FOR REMOVING A PALLET FROM A MOVING TRANSFER MECHANISM AND FOR ACCURATELY LOCKING THE PALLET AT A PRECISE LOCATION

Edmund J. Anderson, Minneapolis, and Wayne P. Desrude, Brooklyn Park, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Apr. 8, 1988, Ser. No. 179,586
Int. Cl.[5] B65G *47/22*
U.S. Cl. 198—345 **7 Claims**



1. A system for removing a pallet from a moving transfer mechanism and for accurately locking the pallet at a precise location, the system comprising:
(a) pallet means for supporting a workpiece, said pallet means including a first sidewall engaging surface and a second sidewall engaging surface, said pallet means further defining a receiving cavity on said first sidewall;
(b) a transfer mechanism comprising at least one moving surface for supporting the bottom surface of the pallet means;
(c) guide rail means located above and adjacent to said transfer mechanism moving surface substantially along the length of said mechanism, said guide rail means having a surface for guiding the travel of a substantially adjacent pallet means as the pallet means moves along the transfer mechanism moving surface;

(d) means for roughly locating said pallet means moving along said transfer mechanism; and

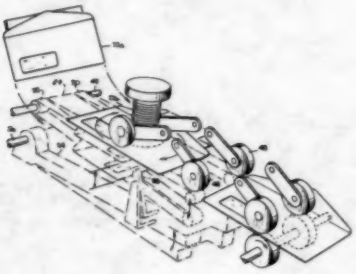
(e) lift and lock means for lifting said roughly located pallet means from said transfer mechanism moving surface and for locking said pallet means into a precise location by applying forces against said first and second sidewall surfaces, said lift and lock means including an engaging bar with a top and a pallet engaging end, said engaging end being formed by side surfaces depending from the top and having an intersection with a forward slope angle from said top and having a triangular cross section formed by the forward slope angle of the engaging bar engaging end and the angle between each side surface and the top of said engaging bar, said receiving cavity in said pallet means being configured for a substantially conformal fit with said triangular cross section, said receiving cavity being defined by said first sidewall and having an apex having a radius and said tapered engaging end of said engaging bar comprising a radius, such that said radius at the apex of said receiving cavity is less than said radius at said tapered engaging end of said engaging bar.

4,928,807

METHOD AND APPARATUS FOR TURNING FLAT ARTICLES

David R. Auerbach, West Redding, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.

Filed Dec. 2, 1988, Ser. No. 279,000
Int. Cl.[5] B65G *47/24*
U.S. Cl. 198—379 14 Claims



1. Apparatus for turning flat articles, comprising:

a frame;

a pair of substantially horizontal, pivotable belt assemblies for receiving a serial stream of said articles traveling along a path, each of said belt assemblies having an upper and a lower reach and an entrance and an exit end;

a rotatable and vertically reciprocable disk member suitably mounted to said frame and situated between said belt assemblies for lifting each of said articles off said belt assemblies;

a biased, pivot ball suitably mounted to said frame and located above said reciprocable disk member for pinning each of said articles when each of said articles is lifted by said disk member; and

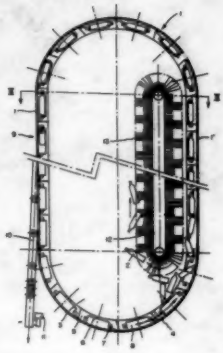
an idler roller situated above the upper reaches of said belt assemblies at the exit end of said belt assemblies for transporting said flat articles downstream from said disk member and ball.

4,928,808

MACHINE FOR UNSCRAMBLING AND POSITIONING CONTAINERS

Jaime S. Marti, Emancipacion No. 8, Barcelona, Spain

Filed Dec. 19, 1988, Ser. No. 286,067
Claims priority, application France, Dec. 18, 1987, 87 18194
Int. Cl.[5] B65G *17/32*
U.S. Cl. 198—397 31 Claims



1. An automatic unscrambler for orientating containers such as plastic bottles and lightweight articles comprising:

a hopper for receiving a plurality of randomly positioned containers;

a side wall on said hopper;

a bottom on said hopper having a peripheral portion spaced from said side wall to provide a space through which the containers can pass;

a plurality of carriages supported below said hopper for movement in a path adjacent said peripheral portion of said bottom;

at least one flexible drive means connected to each carriage for interconnecting said carriages and driving said carriages in said path;

container holders mounted on said carriages for movement therewith and in position for receiving containers from said peripheral portion of said bottom of said hopper;

openings in said container holders for allowing the containers to pass therethrough;

means on each holder engaging one part of each container in a respective holder for tilting the container into a predetermined position as the container passes through the respective opening;

container support means extending below said holders for supporting the containers in said holders during movement of the holders;

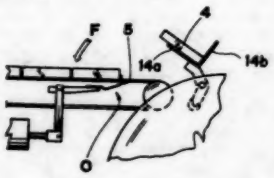
a discharge section in said support means for discontinuing support of the containers at a predetermined location so that containers in said holders pass through said container holder openings at said discharge section; and

passageway means mounted on said carriages below said container holder openings for receiving and orientating containers passing through said openings into a predetermined position.

4,928,809
DEVICE FOR TRANSFERRING ARTICLES FROM A FIRST TO A SECOND CONVEYOR WITH PREDETERMINED ROTATION OF THE ARTICLES DURING THE SAID TRANSFER

Ireneo Bozza, Bologna, Italy

Filed May 9, 1984, Ser. No. 608,458
Claims priority, application Italy, Aug. 4, 1983, 3520 A/83
Int. Cl.[5] B65G *47/24*
U.S. Cl. 198—408 5 Claims

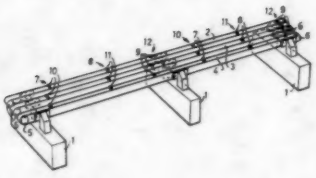


1. Device for transferring articles from a first to a second conveyor through first and second stations, with predetermined rotation of the articles during the said transfer, comprising: a first and second conveyor, a rotatable disc interposed between said conveyors; a plurality of transfer means, each pivotally articulated to said disc, said pivots being angularly equidistant with respect to one another, as well as equidistant from the axis of rotation of said disc, each transfer means defining inner and outer arms, said outer arm having fixed thereto a right angular receiving element for receiver and/or grasping said articles; means for halting and unloosening the leading article in the row of articles present on the first conveyor, positioned upstream of the said first station, said means being operated on a time relationship basis with the passing through the first station of said transfer means; and means for constantly regulating the spatial orientation of said transfer means, so that the article in moving from the first conveyor to the second conveyor will pass through an arc of 90°.

4,928,810
CONVEYOR

Jimmy Hultberg, Ryd, Sweden, assignor to AB Volvo, Goteborg, Sweden

PCT No. PCT/SE87/00411, § 371 Date Feb. 8, 1989, § 102(e) Date Feb. 8, 1989, PCT Pub. No. WO88/01976, PCT Pub. Date Mar. 24, 1988
PCT Filed Sep. 11, 1987, Ser. No. 313,266
Claims priority, application Sweden, Sep. 19, 1986, 860361
Int. Cl.[5] B65G *15, 44*
U.S. Cl. 198—699.1 2 Claims

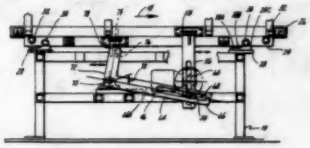


1. A conveyor comprising at least one endless conveyor element, a plurality of pusher means (7, 8, 9) which are carried by said at least one conveyor element and which are adapted to push objects on the conveyor, said pusher means (7, 8, 9) having at least two different cross sectional shapes that vary from pusher means to pusher means lengthwise of the conveyor for pushing different types of solid objects along the conveyor, said different shapes of pusher means (7, 8, 9) being arranged in predetermined fixed positions and in sequential order along said at least one conveyor element (2, 3, 4) and the distance along said at least one conveyor element (2, 3, 4) between a pusher means (7, 8, 9) and the next pusher means of the same cross sectional shape being the same for all types of pusher means (7, 8, 9).

4,928,811
WALKING BEAM APPARATUS

Glenn Waineo, 39001 Schoolcraft Rd., Livonia, Mich. 48150

Filed Dec. 7, 1988, Ser. No. 280,953
Int. Cl.[5] B65G *25/00*
U.S. Cl. 198—774 9 Claims



1. Apparatus for advancing a workpiece along a stepped path of motion, comprising:

a base;

a rail mounted on the base to intermittently support the workpiece as it is being stepped along said path of motion;

a rotary shaft;

power means connected to the shaft for rotating same;

a lifting member mounted on the base for motion therealong, and a first cam member carried by the lifting member;

a second cam member mounted on the base and engageable with the first cam member;

one of said cam members having a cam contour engaged with the other of said cam members such that the lifting member is raised with respect to the base in a cammed path that is in accordance with the contour of said one of said cam members, as the lifting member is being moved along the base;

a transfer bar having means for engaging the workpiece mounted on the rail, and means movably supporting the transfer bar on the lifting member;

first linkage means connecting the shaft to the lifting member such that it is moved on the second cam member in said cammed path in a first direction and then is raised, and then is moved in the opposite direction and then is lowered, as the shaft is being rotated in an arc of motion;

said first linkage means comprising:

a crank carried on the shaft;

a drive member and means mounting same on the base for a rocking motion;

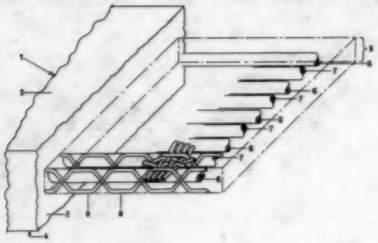
first connecting means comprising the drive member having a slot, and a cam follower carried on the crank and received in the drive member slot such that as the crank is being rotated by the shaft in said arc of motion, the drive member is rocked in a first direction and then is rocked in the opposite direction;

second connecting means connecting the drive member to the transfer bar such that as the drive member is being rocked in said first direction, the transfer bar is moved sequentially from an initial position to engage the workpiece to lift it from the rail and then to advance the workpiece in a step in said first direction along the rail, and then as the drive member is rocked in the opposite direction, the transfer bar lowers the workpiece to deposit it on the rail to complete the step and then returns in the opposite direction to said initial position.

4,928,812
CONVEYOR BELT OF PVC PROVIDED WITH A COMPOUND LAYER OF REINFORCING MATERIAL AND A PROCESS OF WEAVING SAID REINFORCING LAYER

Freerk R. van Calker, Lathum, Netherlands, assignor to Akzo NV, Arnhem, Netherlands

Filed Jun. 2, 1988, Ser. No. 203,732
Claims priority, application Netherlands, Jun. 4, 1987, 8701304
Int. Cl.[5] B65G *15/30*
U.S. Cl. 198—847 **4 Claims**



1. A conveyor belt comprising:
a matrix based on polyvinyl chloride; and
a reinforcing construction embedded in said matrix, said reinforcing construction comprising a compound woven fabric including:
(a) a first layer including (i) a plurality of primary load-bearing warp members each formed by a plurality of substantially parallel cables or cords of continuous filaments of aramid and extending rectilinearly in a longitudinal direction of the belt, each of said primary load-bearing members having an outer diameter D, adjacent ones of said primary load-bearing members being spaced apart from one another to form spaces therebetween having a width which is 0.5–2.0 times said outer diameter D of said primary load-bearing members and (ii) a plurality of second nonaramid cotton comprising filling warp members respectively disposed rectilinearly in said spaces between said primary load-bearing members;
(b) a second layer provided on an upper side of said first layer and a third layer provided on a lower side of said first layer, said second and third layers each comprising cotton yarns adhered to said polyvinyl chloride matrix; and
(c) a plurality of binder warp yarns or filaments which interconnect said first layer, said second layer and said third layer.

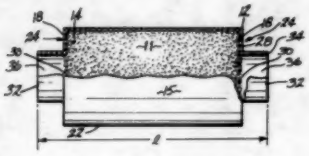
4,928,813
ENCASED POOL CHEMICAL CAPSULE WITH EXTENDED ENDS AND METHOD OF MAKING THE SAME

John M. Casberg, Cheshire, Conn., assignor to Olin Corporation, Cheshire, Conn.

Filed Jun. 2, 1989, Ser. No. 360,666
Int. Cl.[5] B65D *85/62*; C02B *1/18*
U.S. Cl. 206—0.5 **17 Claims**

1. A capsule for use in the dissolution of a halogen chemical compound into a body of water, the capsule comprising:
a tablet section comprising at least one halogen chemical compound tablet, said tablet section having an elongate center section with two opposite end sections; and
shell means securely fitted about said tablet section, said shell means having an elongate center portion substantially encasing said tablet section and two end portions adjacent said tablet end sections, each of said end portions comprising a tablet wall with an aperture therethrough and an extension having a conduit means therethrough, said extensions extending away from said tablet section in substantially opposite directions whereby water must pass through said extensions and said apertures to access said tablet section such that said shell means reduces the dissolving rate of said halogen compound into a body of water, the dissolving rate being at a relatively constant rate.

11. A capsule for use in the dissolution of a halogen chemical compound into a body of water, the capsule comprising:
a tablet section comprising at least one halogen chemical compound tablet, said tablet section having an elongate center section with two opposite end sections; and



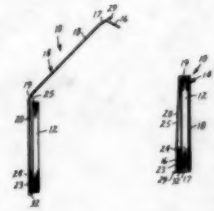
a shell comprising a heat shrinkable tube securely fitted about said tablet section, said tube forming an elongate center portion substantially encasing said tablet section and two end portions extending away from said center portion in opposite directions with relatively smaller cross-sectional shapes than said center portion.

15. A method of manufacturing a capsule for use in the dissolution of a halogen chemical compound into a body of water, the method comprising the steps of:
positioning a halogen compound tablet into a heat shrinkable tubing; and
shrinking the tubing about the tablet such that the tablet is substantially encased by the tubing except for a first end extension and a second end extension of the tubing extending away from the tablet and providing reduced size conduits for providing water access to the tablet.

4,928,814
PAD ENCLOSURE

Klaus Rondot, Düsseldorf, and Jörg Schlichting, Neuss, both of Fed. Rep. of Germany, assignors to Minnesota Mining & Manufacturing Comp., St. Paul, Minn.

Filed Apr. 30, 1987, Ser. No. 44,234
Int. Cl.[5] B65D *85/00*
U.S. Cl. 206—215 **13 Claims**



1. An enclosure for a pad of sheets having front, rear, top and bottom surfaces with said front and rear surfaces being substantially larger than said top and bottom surfaces, said enclosure comprising a rectangular elongate sheet of stiff paper material, said paper material having spaced transverse scores and being bent at said scores to define sequentially along the length of said sheet an end portion, a bottom portion adapted

to overlie and be coextensive with the bottom surface of the pad, a front portion substantially larger than said end and bottom portions adapted to overlie and be coextensive with the front surface of the pad, a top portion of about the same size as said bottom portion adapted to overlie and be coextensive with the top surface of the pad, a rear portion of about the same size as said front portion adapted to overlie and be coextensive with the rear surface of the pad, and outer and inner recess-forming portions, said outer recess-forming portion being generally parallel to and along the surface of said rear portion adapted to be adjacent the pad and said inner recess-forming portion being parallel to and along the surface of the outer recess-forming portion adapted to be adjacent the pad, said rear portion and said recess-forming portions being attached together adjacent the score between said outer and inner recess-forming portions to define a recess between said outer and inner recess-forming portions opening along the adjacent end of said rear portion which recess is adapted to frictionally and removably receive said end portion to close said enclosure.

4,928,815

LENS CONTAINER ASSEMBLY

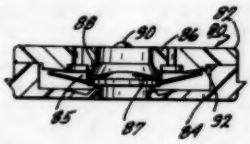
Lyle E. Paul, El Toro, Calif., assignor to Allergan, Inc., Irvine, Calif.

Division of Ser. No. 100,297, Sep. 23, 1987, Pat. No. 4,817,789. This application Mar. 3, 1989, Ser. No. 319,639

The portion of the term of this patent subsequent to Apr. 4, 2006, has been disclaimed.

Int. Cl.[5] B65D *85/38*

U.S. Cl. 206—5.1 **14 Claims**



1. A lens container for holding a lens comprising:
base means;
lens cover means associated with said base means and together with said base means acting to form a compartment of sufficient size to contain a lens; and
clamp means attached to said lens cover means, being movable relative to said base means and said lens cover means, and adapted to be activated to hold said lens in place in said compartment in contact with said clamp means and said base means.

7. A lens container for holding a lens comprising:
base means;
lens cover means associated with said base means and together with said base means acting to form a compartment of sufficient size to contain a lens; and
clamp means including a hollow contact ring and being movable relative to said base means to hold said lens in place in said compartment so that both said hollow contact ring and said base means contact said lens to hold said lens in place in said compartment and substantially prevent movement of said lens.

13. A lens container for holding a lens comprising:
base means;
lens cover means secured to said base means at at least one point and together with said base means acting to form a compartment of sufficient size to contain a lens, said lens cover means being constructed of resilient material;
clamp means being movable relative to said base means and said lens cover means and adapted to be activated to hold said lens in place in said compartment; and
projection means secured to said lens cover means and adapted to be contacted to activate said clamp means.

4,928,816

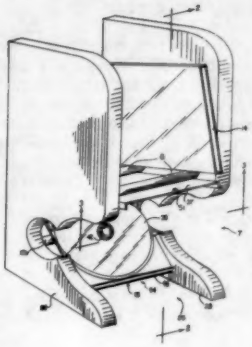
APPARATUS FOR MANIPULATING COMPACT DISC JEWEL BOXED

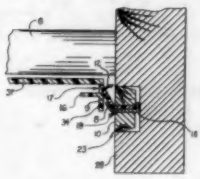
Matthew S. Zusy, 1202 Brookview Blvd., Parma, Ohio 44134

Filed Nov. 28, 1988, Ser. No. 276,944

Int. Cl.[5] B65D *85/57*

U.S. Cl. 206—232 **16 Claims**





1. An apparatus for manipulating a jewel box to assist in the opening and closing of said jewel box, thereby allowing the extraction and return of a compact disc stored therein, said prior art jewel box comprising:
a shallow rectangular box having a body adapted to releasably hold within it a compact disc, a cooperating rectangular lid having slots paired on opposite edges thereof and being hingedly attached to said body at substantially a third edge, the fourth edge being referred to as the lip edge, and a detent mechanism operatively positioned at mating surfaces of said body and said lid to releasably retain said lid in a closed position; and
said apparatus comprising:
a plurality of oppositely disposed paired catch members supported in a substantially horizontal plane and adapted to selectively engage and release said slots in said lid, thereby to selectively either support said jewel box by its lid therebetween or release said jewel box, the selection being made at the discretion of the user by manually imposing appropriate movement of said box relative to said catch members for engagement or release thereof;
wherein while said jewel box is supported by said catch members, light pressure on the center of the lip edge of said lid causes said cover to flex in a way to release said detent mechanism, thereby allowing said body of the box to open away from said lip by pivoting on said hinged attachment, thus allowing access to a compact disc stored within.

9. A combination comprising a jewel box and an apparatus for assisting in the opening and closing of said jewel box, thereby allowing the extraction and return of a compact disc stored therein, said prior art jewel box comprising:

a shallow rectangular box having a body adapted to releasably hold within it a compact disc, a cooperating rectangular lid having slots paired on opposite edges thereof and being hingedly attached to said body at substantially a third edge, the fourth edge being referred to as the lip edge, and a detent mechanism operatively positioned at mating surfaces of said body and said lid to releasably retain said lid in a closed position; and

said apparatus comprising:

a plurality of oppositely disposed paired catch members supported in a substantially horizontal plane and adapted to selectively engage and release said slots in said lid, thereby to selectively either support said jewel box by its lid therebetween or release said jewel box, the selection being made at the discretion of the user by manually imposing appropriate movement of said box relative to said catch members for engagement or release thereof;

wherein while said jewel box is supported by said catch members, light pressure on the center of the lip edge of said lid causes said cover to flex in a way to release said detent mechanism, thereby allowing said body of the box to open away from said lip by pivoting on said hinged attachment, thus allowing access to a compact disc stored within.

4,928,817

PACKAGING FOR A PLURALITY OF SMALL PACKS, ESPECIALLY CIGARETTE PACKS

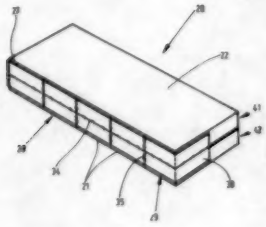
Heinz Focke, Verden, Fed. Rep. of Germany, assignor to Focke & Co. (GmbH & Co.), Verden, Fed. Rep. of Germany

Filed May 5, 1989, Ser. No. 347,850

Claims priority, application Fed. Rep. of Germany, May 30, 1988, 3818285

Int. Cl.[5] **B65D** *5/48*

U.S. Cl. 206—256 **7 Claims**



1. Packaging for a plurality of cigarette packs (20) and including a wrapping (22) in which the cigarette packs are wrapped to form an elongated stick of cigarette packs, opposite end walls (26, 27) of the packs facing respective opposite side faces (28, 50) of the wrapping.

wherein said wrapping (22) is open at least in the region of one of its side faces (28, 50) so that the pack end walls (27) facing this open side face (28) are not covered by said wrapping (22) in which the cigarette packs (21) are wrapped;

wherein said pack end walls (27) not covered by said wrapping (22) are connected to one another and to said wrapping (22) solely by adhesive strip means (36, 37) which is glued across the open side face (28) of said wrapping (22) on the uncovered pack end walls (27) of the wrapped packs (21), and which has opposite ends (30) glued on respective opposite narrow sides (31) of said wrapping (22); and

wherein the uncovered end wall (27) of each cigarette pack (21) is assigned a different section (33) of a plurality of sections of said adhesive strip (29, 36, 37), said sections being adapted to receive markings and being defined by weakened dividing lines.

4,928,818

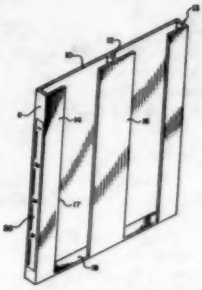
CONTAINER FOR COMPACT DISKS

Alan Friess, 3604 Hillview Crescent, Edmonton, Alberta, Canada (T6L 1C4), and Colin Friess, 1432 - 63 Street, Edmonton, Alberta, Canada (T6L 1X7)

Filed Aug. 28, 1989, Ser. No. 399,027

Int. Cl.[5] **B65D** *65/672*

U.S. Cl. 206—309 **19 Claims**



1. A container for storing compact disks comprising a planar support member which is square in plan defining four sides each substantially equal to twelve inches in length, and receiving means mounted on at least one side of the support member for receiving a plurality of said compact disks, said receiving means being shaped to receive said compact disks mounted parallel to the support member and so as to confine said compact disks to lie spaced apart on and within the square face of the support member, said container being self-supporting and thin so as to simulate the size of a conventional twelve inch record.

4,928,819

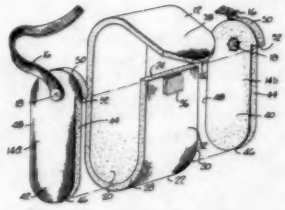
AIR PERMEABLE CAMERA CASE

Katherine Jakobsen, Aurora, Colo., assignor to Satter, Inc., Denver, Colo.

Filed Sep. 14, 1989, Ser. No. 407,262

Int. Cl.[5] **A45C** *11/38;* **B31B** *1/72*

U.S. Cl. 206—316.2 **12 Claims**



1. A camera case comprising:

an air permeable, resilient body having inner and outer surfaces which are connected by a first peripheral edge, said first peripheral edge having a first end edge portion, a second end edge portion, a first side edge portion and a second side edge portion, said body also defining a front wall, a bottom wall, a rear wall and a closing flap of said case; and

first and second air permeable, resilient end plates, each of

which has inner and outer surfaces which are connected by a second peripheral edge, said second peripheral edge of each end plate having a front edge portion, a bottom edge portion, a rear edge portion, a top edge portion and a notched edge portion, said notched edge portion adjoining said top edge portion and said front edge portion, said notched edge portion also being sized and configured to mate with said first end edge of said body so that said outer surface of said front wall of said body is capable of being flush with said top edge portion of each end plate, said body and said end plates being secured to each other such that said first end edge of said body is bonded to said notched edge portion of said end plates and so that said inner surfaces of said front, said bottom and said rear walls of said body are bonded, respectively, to said front, said bottom and rear edge portions of said end plates, said end plates further being aligned with respect to said body so that said outer surface of said first end plate is flush with said first side edge of said body and said outer surface of said second end plate is flush with said second side edge of said body.

10. A method of assembling a camera case comprising:

providing an air permeable, resilient body having inner and outer surfaces which are connected by a first peripheral edge, the first peripheral edge having a first end edge portion, a second end edge portion, a first side edge portion and a second side edge portion, the body also defining a front wall, a bottom wall, a rear wall and a closing flap of the case;

providing first and second air permeable, resilient end plates, each of which has inner and outer surfaces which are connected by a second peripheral edge, the second peripheral edge of each end plate having a front edge portion, a bottom edge portion, a rear edge portion, a top edge portion and a notched edge portion, the notched edge portion connecting the top edge portion to the front edge portion, the notched edge portion also being sized and configured to mate with the first end edge portion of the body so that the outer surfaces of the front wall of the body and the top edge portions of each end plate are capable of being flush with each other when they are bonded to each other;

applying adhesive to the notched edge portions, the front edge portions, the bottom edge portions and the rear edge portions of the end plates;

locating the first end edge of the body up against the adhesive coated notched portion of each end plate so that the top edge portions of the end plates are flush with the outer surface of the front wall of the body and so that the outer surface of the first end plate is flush with the first side edge of the body and the outer surface of the second end plate is flush with the second side edge of the body;

after so locating the first end edge of the body, wrapping the body about the second peripheral edges of the end plates so that the outer surface of the first end plate is flush with the first side edge of the body and the outer surface of the second end plate is flush with the second side edge of the body; and

maintaining the body in the wrapped position about the end plates until the front, bottom and rear walls of the body bond, respectively, to the front, bottom and rear edge portions of the end plates.

4,928,820

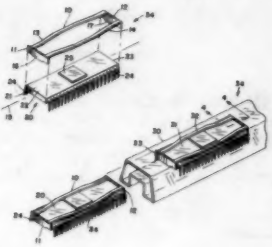
SNAP ON BUMPER FOR ELECTRONIC PACKAGES

Robert H. Murphy, Merrimack, and Roland Gosselin, Nashua, both of N.H., assignors to R. H. Murphy Company, Inc., Amherst, N.H.

Filed Jul. 7, 1989, Ser. No. 377,164
Int. Cl.[5] B65D *73/02*
U.S. Cl. 206—328 **12 Claims**

1. A shock absorbing bumper for oppositely disposed planar end surfaces of a device that is adapted to move along a longitudinal axis transverse to the planar end surfaces, the end surfaces being spaced a predetermined distance from each other, and that has a surface extending between the end surfaces, said bumper comprising:

A. overlying end means for overlying the opposite end surfaces of the device thereby to form a shock-absorbing bumper surface at each end surface parallel thereto,



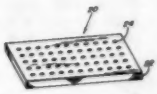
B. integral interconnecting means for establishing a parallel relationship between said end means with a spacing between said end means corresponding to the predetermined distance, said interconnecting means being positioned adjacent to the surface of the device and being capable of elastic elongation for increasing the spacing between said overlying end means and producing a restoring force for clamping a device between said overlying end means.

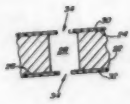
4,928,821

SPRING TENSION HOLDING MEANS

William R. Belko, Jr., 2005 Pintoresco Ct., Rancho La Costa, Calif. 92009

Filed Jul. 8, 1988, Ser. No. 216,893
Int. Cl.[5] B65D *73/02*
U.S. Cl. 206—329 **5 Claims**





1. A holding means for miniature electronic components having substantially squared edges comprising a base plate having upper and lower major surfaces and an array of spaced apart openings which extend through the base plate and provide communication between such upper and lower surfaces, the diameter of the openings being at least as large as the largest areal dimension of the components being held; a first layer of an elastomeric material removably attached to the upper surface of the base plate, the first layer of elastomeric material having an array of openings therein aligned with the openings in the base plate, the cross-sectional area of the openings being smaller than the cross-sectional area of the components to be held, and at least one slit cut into the elastomeric material adjacent each opening such that when a component is inserted into such opening the areal dimensions of the opening are substantially the same as the areal dimensions of such

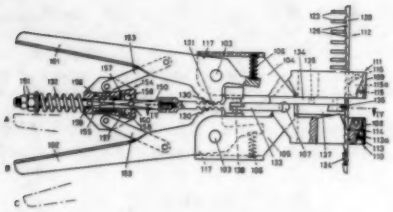
components; and, a second layer of elastomeric material removably attached to the lower surface of the base plate, the second layer of the elastomeric material having an array of openings therein aligned with the openings in the base plate and the openings in the first layer of elastomeric material, the cross-sectional area of the openings in the second layer of elastomeric material being smaller than the cross-sectional area of the components to be held therein, wherein when components are inserted into the holding means they are held in place by the gripping action of the elastomeric material, in tension, along the sides of the components.

4,928,822

CABLE END SLEEVE MAGAZINE

Carl Geisser, Letzigraben 156, CH-8047 Zürich, Switzerland

Division of Ser. No. 26,571, Mar. 17, 1987, Pat. No. 4,765,176.
This application May 25, 1988, Ser. No. 202,573
Claims priority, application Switzerland, Mar. 25, 1986, 1215/86
Int. Cl.[5] B65D *73/02*
U.S. Cl. 206—330 **1 Claim**



1. A cable end sleeve magazine comprising

a unitary disposable, elongated carrier formed of plastic material having a side surface extending in a longitudinal direction of said carrier, said carrier having a plurality of uniformly spaced throughgoing openings in a single row and perpendicular to said side surface, said openings extending through said carrier from said side surface to an opposing surface, and a plurality of saw-tooth shaped recesses transversely displaced from said openings for advancing said carrier in a crimping tool, the recesses having opposed flat and steep flanks, the flat flanks being inclined relative to said side surface, the recesses being uniformly spaced with the same spacing as the openings, and

a plurality of cable end sleeves removably inserted and held in said openings, said cable end sleeves projecting from said opposing surfaces of the carrier to be fed to said crimping tool for crimping one at a time, onto a cable end and removing the crimped-on cable end sleeve from the carrier.

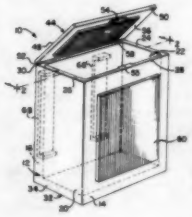
4,928,823

HOLDER FOR STAPLES, CARPET TACKS, NAILS, SCREWS AND OTHER DISCRETE MAGNETIZABLE ITEMS

James P. Campbell, 144 Laurel St., Bridgewater, Mass. 02324

Filed Sep. 29, 1988, Ser. No. 250,535
Int. Cl.[5] B65D *85/24*
U.S. Cl. 206—338 **5 Claims**

4. Holder for a plurality of loose carpet tacks, nails, screws and the like discrete items capable of being attracted to a magnet, said holder being of a box-like structure and being defined by planar, spaced-apart, parallel front and back walls, and parallel, spaced-apart side walls, said box-like structure being further defined by a closed bottom and an open top whereby to define an internal, elongated cavity for the holding of said plurality of loose, discrete items for use, a closure member for said open top defined by an inner planar surface, and a planar magnet being attached to said planar inner surface of the said closure, whereby as the discrete items in the holder are used and the number of loose discrete items remaining in the holder diminishes so that any of such items remaining becomes less accessible, certain of the remaining such items can be made



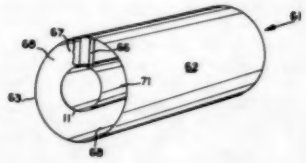
readily available to the user at the top of the holder and easily accessible for use by the user shaking the holder and causing the diminished supply of discrete items to contact the said magnet whereby certain of said discrete items will be attracted and separated from the others in the diminished supply and detachably held by the magnet.

4,928,824

HYPODERMIC NEEDLE SHEATH PROTECTION SHIELD APPARATUS

Stephen T. Barasch, 2335 Edgewater La., Largo, Fla. 34644

Filed Sep. 15, 1987, Ser. No. 96,732
Int. Cl.[5] A61M *5/00*
U.S. Cl. 206—365 **2 Claims**



1. An apparatus for the sheathing of a hypodermic needle which is adapted to protect a person's sheath-holding hand during sheathing, said apparatus comprising;

a sheath for a hypodermic needle;

said sheath being fastened at some point to at least one joining member, said joining member being further fastened to a shrouding member such that such fastened joining member is of adequate strength and rigidity to remain fastened under the pressure caused by the impact of a stray needle during a sheathing operation to either said joining member, said sheath, or said shrouding member;

said shrouding member further comprising an external surface which is generally parallel with the external surface of said sheath and surrounds said sheath along some part of the length of said sheath;

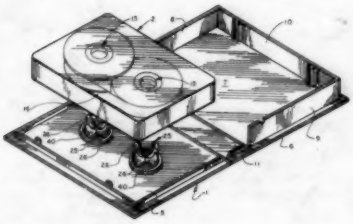
said shrouding member external surface being, at all points, some distance from the nearest point on said sheath external surface.

4,928,825

CASSETTE STORAGE CONTAINER

Bruce A. Hehn, Massillon, Ohio, assignor to Alpha Enterprises, Inc., Canton, Ohio

Filed May 31, 1989, Ser. No. 359,104
Int. Cl.[5] B65D 85/67
U.S. Cl. 206—387 14 Claims



1. A container for storing a tape cassette of the type having at least one tape reel hub comprising a cylindrical sidewall defining a recess in the hub, said hub recess being accessible through an opening formed in a bottom wall of the cassette, said storage container including enclosure means for receiving and enclosing a tape cassette in the storage container; and hub engaging means formed on the storage container and located for entering the hub recess through the access opening when a cassette is placed in said container for preventing rotation of the tape reel hub, said hub engaging means including at least a pair of flexible, generally opposed fingers movable between normal biased and flexed positions, said fingers being formed on the storage container in a diametrically opposed relationship with each of the fingers being a generally flat member formed with a concave inner edge and a generally convex outer edge, said convex outer edge having an undercut lower portion, an arcuate upper portion which serves as a camming surface for moving the finger to the flexed position upon initial placement of a cassette into the storage container and into engagement with the cylindrical sidewall of the tape reel hub, and a generally elongated straight intermediate portion which engages the sidewall of the hub in an axially extending direction to provide frictional line contact therebetween to prevent rotation of the hub when the cassette is fully inserted into the storage container and the fingers urge toward the normal biased position.

4,928,826

PATRONE FOR PHOTOGRAPHIC FILM

Osamu Shibazaki, Hino; Yorikatu Miyazawa, and Toshio Kato, both of Hachioji, all of Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Oct. 12, 1988, Ser. No. 256,794
Claims priority, application Japan, Mar. 18, 1988, 63-36801[U]; Mar. 18, 1988, 63-36802[U]
Int. Cl.[5] G03B 17/26
U.S. Cl. 206—409 11 Claims

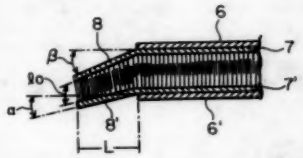
1. A cartridge for packaging a roll of film comprising:

a shell having inner and outer faces, longitudinal side edges and first and second ends, said shell being substantially cylindrical rolled to form an interior for housing the roll of film;

said first and second ends of said shell forming upper and lower lips overlapping and spaced a distance from one another to form a slit for the insertion and removal of the film forming the roll of film;

first and second ribbons having a flat surface and a pile surface to shield said interior of said shell from light, said first and second ribbons being attached to said upper and lower lips, respectively and extending at first and second angles, respectively to said lip and beyond said slit, for first angle of said first ribbon being greater than said second angle of said second ribbon; and

a plurality of caps having a central face and including a



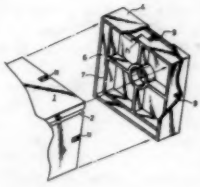
circumferential edge extending therearound said circumferential edge of said caps forming a U-shaped groove for receiving and contacting said inner and outer faces of longitudinal side edges of said shell.

4,928,827

LIGHT-TIGHT CASSETTE

Yoshio Haru, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Ashigara, Japan

Filed Apr. 29, 1988, Ser. No. 188,432
Claims priority, application Japan, May 1, 1987, 62-65306[U]; Jun. 24, 1987, 62-95901[U]
Int. Cl.[5] B65D 85/67
U.S. Cl. 206—416 1 Claim



1. A light-tight cassette for holding a roll of light sensitive material and which includes a tubular body of polygonal cross-section; said body being open at each end thereof and having a slot adjacent to an edge of said body and extending along said body so as to provide an outlet opening through which said material passes; said slot provided with a construction for keeping light from reaching said material in said container through said slot; and, end cap means for closing said each end of said body comprising, an outer frame and an inner frame for said end cap means, said frames extending circumferentially of said cap means, said frames positioned at a substantially uniform distance from each other so that a groove is defined between said outer and inner frames with said each end of the body being received in said groove; and, a plurality of ribs being provided at regular intervals in said groove, wherein the open ends of the tubular body are provided with notches for receiving the ribs when the end caps are positioned to cover said each end of said body.

4,928,828

STORAGE HOLDER FOR COMPUTER DISKETTES

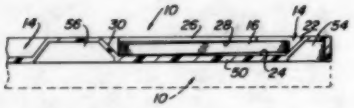
Jay B. Cohen, Philadelphia, Pa., assignor to Cobar, Inc., Cheltenham, Pa.

Continuation of Ser. No. 103,871, Oct. 2, 1987, abandoned. This application Oct. 4, 1989, Ser. No. 418,746
Int. Cl.[5] B65D 85/30
U.S. Cl. 206—444 5 Claims

1. For use in a binder of the loose-leaf type, an insert for

holding and protecting computer diskettes and the like, comprising:

a page-like member having therein a plurality of recesses adapted to receive diskettes, said recesses being defined by respective side and end walls extending across said recesses, one of said end walls providing a ramp portion to facilitate insertion of a diskette into the recess, said diskettes having respective first and second faces, access to said recesses being provided through slots defined by an entrance portion having a width in excess of the width of a diskette and an open slot portion intersecting said entrance portion and extending generally perpendicularly thereto, said slots being generally T-shaped, said entrance portion defining the top of the "T" and said open slot portion defining the stem of the "T", the width of said open slot portions being sufficient to facilitate entry of a diskette into said recesses, said ramp portion being associated with said entrance portion and juxtaposed to said flap portions, said ramp portion and said flap portions cooperating to provide a snap action to retain diskettes in said recesses, said ramp portion and said flap portions partly closing said recesses and adapted to engage diskettes received in said recesses, said flap portions being disposed on opposite sides of said open slot portion so as to partly overly lateral edges of a diskette received in a recess, said



flap portions being resiliently displaceable to provide said snap action to facilitate entry of diskettes into said recesses and to frictionally engage the first faces of the diskettes when diskettes are disposed in said recesses to thereby retain said diskettes in said recesses, said recesses having bottom wall portions, the second faces of the diskettes abuttable with said bottom wall portions when diskettes are disposed in said recesses, said page-like member being made of plastic polymeric material and having a sinuous cross-section defining said recesses and flap portions, said flap portions having surfaces flush with and in part defining one face of said page-like member, said one face being the uppermost surface of said member and said bottom wall portions of said recesses being flush with and having surfaces in part defining the other face of said page-like member, said other face of said page-like member being the lowermost surface of said member, the respective faces of said member being substantially flat and adapted to conform to and abut with respective faces of an adjacent page-like member when a plurality of such members are disposed in a loose-leaf binder, said bottom wall portions of said recesses being juxtaposed to and covering open slot portions of an adjacent member to aid in retaining diskettes in said recesses when said page-like members are disposed in a binder.

4,928,829

DEVICE FOR TIGHTLY SEALING BAGS DESTINED TO THE VACUUM PACKAGING OF VARIOUS PRODUCTS, IN PARTICULAR FOODSTUFFS

Pietro Di Bernardo, Milan, Italy, assignor to Interdibipack S.p.A., Mazzo Di Rho, Italy

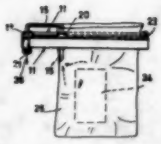
Filed Jan. 18, 1989, Ser. No. 298,167

Claims priority, application Italy, Jan. 22, 1988, 19170 A/88

Int. Cl.[5] B65B *31/06*; **B65D** *33/17*

U.S. Cl. 206—524.8 **5 Claims**

1. A clamping mechanism for tightly sealing a bag and for vacuum packing of product within the bag without any other seal, the bag having an open side with a pair of mutually opposed edges, said clamping mechanism comprising a clamping member and a valve element cooperating with each other to evacuate air contained inside the bag containing the product when said valve element is connected a source of vacuum in order to produce the vacuum packaging of the product, said clamping member having means for grasping and tightly closing the mutually opposed edges of the bag against each other



whereby the open side of the bag is sealed closed, said valve element having a connection duct which extends through said grasping and tightly closing means and is insertable into the interior of the bag.

wherein said grasping and tightly closing means are a pair of mutually opposed rod-shaped jaws pivoted together at one end on a pivot with said valve mounted at said pivot.

4,928,830

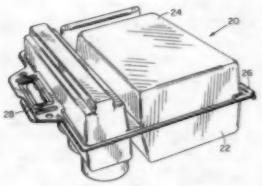
SUCTIONING SUPPLY KIT

Cecil C. Brewer, Missouri City, Tex., assignor to Board of Regents, The University of Texas System, Austin, Tex.

Filed Oct. 31, 1988, Ser. No. 265,389

Int. Cl.[5] B65D *71/00*

U.S. Cl. 206—570 **27 Claims**



1. A kit for use in performing a suctioning procedure, comprising:

a tray; and

suctioning supplies, including

a pair of surgical gloves;

an ampule containing a saline solution;

a suction catheter;

a lubricating gel; and

a disposable bottle containing water;

the suctioning supplies being removably disposed within the tray.

4,928,831

GARMENT-GREETING CARD COMBINATION

Carol L. Kirsch, 1638 Huntington Dr., Apt. C, S. Pasadena, Calif. 91030

Filed Oct. 10, 1989, Ser. No. 419,079

Int. Cl.[5] B65D *5/06*

U.S. Cl. 206—575 **14 Claims**

1. A novelty greeting card having a greeting card design comprising a combination of a stiffener element disposed in an item of wearing apparel, wherein:

(a) the stiffener element has at least one score line to facilitate the folding of the stiffener element;

(b) the item of wearing apparel comprises a wearing apparel design and is attached to the stiffener element;

(c) the combination is foldable along the score line so that

the combination can assume a greeting card shape comprising a front facing planar surface, at least two interior planar surfaces and a back facing planar surface; and

(d) at least one of the planar surfaces comprises a portion of

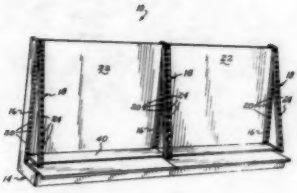
the item of wearing apparel disposed flat against the stiffener element with at least a portion of the wearing apparel design disposed in the planar surface in such a way that the wearing apparel design forms an integral part of the greeting card design.

4,928,832

ADJUSTABLE MERCHANDISE DISPLAY RACK

John L. Overmann, Cincinnati, Ohio, assignor to Hamilton Fixture Company, Ohio

Filed Oct. 25, 1988, Ser. No. 262,275
Int. Cl.[5] A47F *5/00*
U.S. Cl. 211—187 **4 Claims**



1. A merchandise display rack comprising:

a base structure;

a plurality of substantially parallel vertical standards, each said vertical standard having an upper and a lower end, said standards affixed at their lower ends to said base structure and extending upwardly at spaced positions along said base structure, each standard having a series of vertically spaced slots for receiving hook means; and

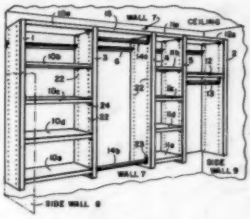
a plurality of angled legs, each having an upper end, a lower end opposite sides and having a hook means at its upper end which is laterally slidably adjustable between said opposite sides for attaching said upper end of said leg to a slot o a corresponding vertical standard, each leg adapted to be attached at its lower end to said base structure outwardly of a corresponding vertical standard so that said leg slants downwardly and outwardly from said standard, each leg having along its height a series of vertically spaced slots, similar to those of the standards, to which merchandise display means can be interconnected.

4,928,833

STORAGE ORGANIZER SYSTEM AND MEANS FOR INSTALLING THE SAME

Lee M. Huizenga, 1298 Waukazoo Dr., Holland, Mich. 49424

Filed Aug. 24, 1988, Ser. No. 235,976
Int. Cl.[5] A47F *5/08*
U.S. Cl. 211—187 **15 Claims**



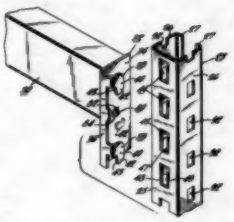
1. In a storage organizer system mounted adjacent a wall of a storage space comprising a plurality of upright panels extending perpendicular to said wall and supporting support members therebetween, the improvement comprising a horizontal rail mounted on said wall and having a projection extending upwardly and away from said wall; and each of said panels having an edge abutting said wall with a cutout portion receiving said projection whereby said panels and the support members therebetween are hung on said rail; said cutout portions being shaped so as to receive said projection as said panel is moved perpendicular to said wall and said cutout portion is dropped down and over said projection.

4,928,834

SAFETY BEAM LOCK

Richard D. Neiman, Chester Springs, Pa., assignor to Vesper Corporation, Bala-Cynwyd, Pa.

Filed Jun. 6, 1988, Ser. No. 203,172
Int. Cl.[5] A47B *47/00*
U.S. Cl. 211—191 **9 Claims**



1. In a metal structural frame for shelving having

(1) upright posts

(a) of open box construction in cross section with

(b) a front face and sides extending from the front face, and

(c) spaced vertical slots in the front face; and

(2) horizontal beams having

(a) a plate at the end of a beam, and

(b) lugs extending from the plate in a direction generally transverse to the beam;

wherein a beam is connected to a post by engaging the lugs in the slots; the improvement comprising

a safety lock for preventing dislodgment of the beam from the post, having

(1) vertically spaced slots in the post sides,

(2) a tab projection at the end of the beam extending from the plate for

(a) causing the post side to yield inwardly during engagement of the beam lugs into the post front face slots, and

(b) entering a slot on the post side when the lugs are fully engaged in the front face slots;

wherein the post side springs back outwardly, locking the tab projection in the post side slot, thus preventing the lugs from being disengaged from the post front face slot, and from being dislodged from the post.

4,928,835

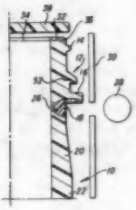
INJECTION MOLDED PREFORM, METHOD OF TREATING SAME AND CONTAINER FORMED THEREFROM

Wayne N. Collette, Merrimack, N.H., and Ralph Armstrong, Weston, Conn., assignors to Continental PET Technologies, Inc., Norwalk, Conn.

Filed Jan. 31, 1989, Ser. No. 304,469

Int. Cl.[5] **B29C** *49/06, 49/04;* **B65D** *1/02, 23/00*

U.S. Cl. 215—31 **19 Claims**



13. A blow molded plastic container comprising a neck portion, a shoulder portion leading from said neck portion to a tubular body, and said tubular body being closed by a bottom portion, a crystallized ring portion between said neck portion and said shoulder portion maintaining axial alignment of said tubular body with said neck portion, said neck portion having an open end defined by a crystallized end sealing surface and said neck portion between said crystallized end sealing surface and said crystallized ring portion being a non-treated amorphous region and including thread means for receiving a closure.

4,928,836

BABY BOTTLE WITH AIR VALVE

Min-Yu Wu, and Andrew H. Wu, both of 1219 Brandybuck Way, San Jose, Calif. 95121

Filed Sep. 28, 1988, Ser. No. 252,813

Int. Cl.[5] **A61J** *9/04*

U.S. Cl. 215—11.5 **4 Claims**

1. A baby bottle having a pressure-sensitive air valve, comprising:

a baby bottle having a portion of the wall thereof removed;

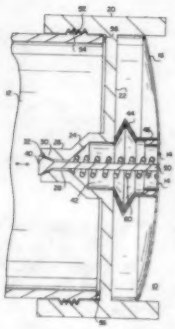
an air valve having a means for engagement thereof to said baby bottle, such that said air valve will enclose said portion of said baby bottle where said wall portion is removed, whereby said baby bottle will retain liquid upon the engagement of said air valve therewith;

said air valve including a rigid valve housing and an air pressure-sensitive member, said air pressure-sensitive member being sealingly engaged within said housing and forming a wall of said baby bottle;

said air pressure-sensitive member having at least one air hole formed therethrough to permit air to enter said baby bottle;

portions of said air valve being formed as an air chamber, said air chamber being sealingly engaged to said air pressure-sensitive member proximate said air hole, whereby air passing through said air hole will enter said air chamber;

a valve means being fixedly engaged to said air pressure-sensitive member and disposed for forming an airtight seal with portions of said valve housing;



said air pressure-sensitive member including a thin-walled diaphragm;

whereupon movement of said air pressure-sensitive member will cause disengagement of said valve means from said valve housing, whereupon air from said air chamber will enter said baby bottle.

4,928,837

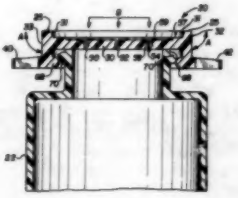
TAMPER EVIDENT CLOSURE

Yoram Curiel, Aurora, Colo., assignor to TSL Incorporated, Aurora, Colo.

Filed May 4, 1989, Ser. No. 347,363

Int. Cl.[5] **B65D** *51/00*

U.S. Cl. 215—250 **23 Claims**



1. A resilient closure for a container, comprising:

an end wall having at least one upwardly open elongated groove;

an annular skirt depending from said end wall; and

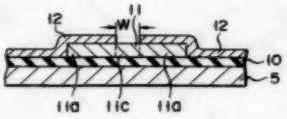
a resin deposited on the top surface of said end wall and in said groove, whereby moving said closure cap away from said container will cause a portion of said resin to fracture.

4,928,838

TRIMMING PROCESS BY A LASER BEAM

Kaoru Imamura, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 4, 1989, Ser. No. 293,278
Claims priority, application Japan, Jan. 13, 1988, 63-5566
Int. Cl.[5] B23K *26/00*
U.S. Cl. 219—121.69 **14 Claims**



1. A trimming process by a laser beam comprising the steps of:

forming a laser shield layer over an untrimmed region of a trimmed material adjacent to a trimmed region, said laser shield layer having a higher heat conductivity than said trimmed material and a higher reflectivity for the laser beam than said trimmed material; and

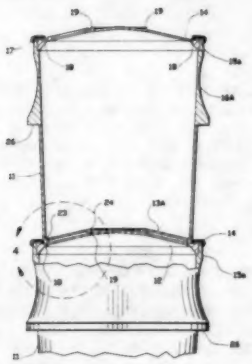
cutting off a first portion of said trimmed material by applying a laser beam onto the upper surface of said trimmed region of said trimmed material and vaporizing the trimmed material in said trimmed region.

4,928,839

PLASTIC DRUMS FOR STORING OR TRANSPORTING LIQUID AND SOLID PRODUCTS

Donald A. Kruelskie, Baton Rouge, La., assignor to The Dow Chemical Company, Midland, Mich.

Filed Sep. 8, 1989, Ser. No. 404,994
Int. Cl.[5] B65D *7/00*
U.S. Cl. 220—5 R **9 Claims**



1. A stackable drum fabricated of a plastic material, which comprises:

an elongate, circular drum wall that tapers downwardly from the top end to the bottom end of the drum wall;

a removable circular lid for closing the top end of the drum wall;

a bottom member joined to the bottom end of the drum wall, for closing the drum wall;

the drum wall having an outside surface, and the top end of the drum wall defining a lip portion;

a removable support ring that fits snugly against the outside surface of the drum wall, and the ring being positioned just below the lip portion of the drum wall;

the circular lid having a convex profile, and an outer edge that defines a hook structure;

the circular lid having a top surface in which is formed a large diameter rib portion, and a small diameter rib portion;

the large diameter rib portion of the lid being located adjacent to the hook structure, and the small diameter rib portion of the lid being surrounded by the large diameter rib portion;

the bottom member having a concave profile, and an underside surface in which is formed a spline portion and a slot portion;

the spline portion being formed at the periphery of the bottom member, and the slot portion being surrounded by the spline portion;

wherein, the hook structure on the lid of the drum defined herein is adapted to seat down onto the lip portion of the drum wall;

the spline portion on the bottom member of the drum defined herein is adapted to seat down against the large diameter rib portion in the lid of another drum having a similar design;

the slot portion on the bottom member of the drum defined herein is adapted to seat down over the small diameter rib portion in the lid of another drum having a similar design;

such that the drum defined herein is adapted for combining with other drums of a similar design to provide a stable drum stack.

4,928,840

TAMPER PROOF ENCAPSULATED MEDICAMENTS

Stanley F. Barshay, Old Westbury, and Peter Mayer, New York, both of N.Y., assignors to American Home Products Corporation, New York, N.Y.

Filed Feb. 25, 1986, Ser. No. 834,989
Int. Cl.[5] B65D *8/00, 53/06;* **A61K** *9/48*
U.S. Cl. 220—8 **1 Claim**

1. A tamper-proof capsule dosage form containing a pharmaceutical medicament for oral administration comprising:

(a) an elongated essentially round hard gelatin capsule made in two sections slip-fit joinable;

(b) a solid caplet containing a medicament substance shaped and sized closely to fit within the assembled capsule; and

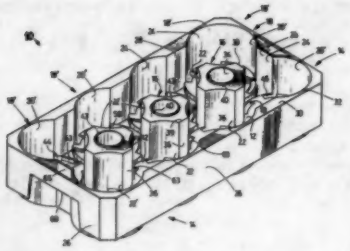
(c) a pharmaceutically acceptable adhesive situated between each caplet end and the adjacent inner surface of the capsule.

4,928,841

BOTTLE TRAY

Raymond C. Arthurs, Scarborough, Canada, assignor to Scepter Manufacturing Company Limited, Don Mills, Canada

Filed May 13, 1988, Ser. No. 193,757
Int. Cl.[5] B65D *1/24, 21/02, 71/00, 75/00*
U.S. Cl. 220—21 **13 Claims**



1. A tray for holding bottles having cylindrically round lower portions comprising:

a generally rectilinear box with an open top, a bottom and resilient side walls;

at least one free-standing upright pillar, the base of the pillar resiliently attached to the interior bottom of the box;

wherein each such pillar is located to be interposed between adjacent bottles whereby the tray is divided into circular bottle receiving compartments formed from the pillar and the resilient side walls;

wherein each such pillar is placed along a line parallel to a longitudinal box side whereby the box is divided into two or more rows, each having a plurality of compartments;

wherein each such pillar and resilient side walls provide curved surfaces which match the side walls of a bottle to be received therein such that the side walls of each pillar have surface portions of arcuate horizontal section spaced around the perimeter of the pillar, the sidewalls of the box have surface portions of arcuate horizontal section, and respective curved surfaces of each compartment are concentrically arranged about and equally spaced from a central upright axis of said compartment;

wherein each pillar further comprises an upright, hollow inner cylinder wherein a pillar roof connects the pillar side walls and inner cylinder; and

wherein when empty of bottles, opposite wall surface portions of each compartment are spaced at a distance slightly less than that of the corresponding width of a bottle to be received in that compartment.

4,928,842

DEVICE FOR STOPPING THE SPILLAGE OF POPCORN

Julius A. Swenson, 4209 Sandwood Dr., Columbia, S.C. 29206

Filed Sep. 15, 1989, Ser. No. 407,815
Int. Cl.[5] A47J *43/00*
U.S. Cl. 220—85 R **5 Claims**

1. A device for serving popcorn, comprising:

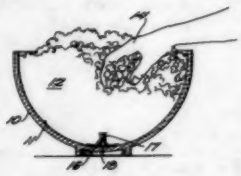
a container with a generally concave interior;

a vertical member having an irregular exterior surface attached to the interior surface of said container at approximately the center thereof;

said vertical member having a cross-section that is smaller in the middle than at the ends;

said vertical member irregular surface comprising a plurality of fluted sides;

whereby during removal of the popcorn from the container, the popped kernals tend to interlock with each other and against the vertical member, thus causing the popcorn to



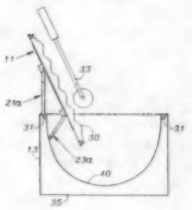
remain in the container rather than spill from the opposite side of the container.

4,928,843

INTEGRATED PAINT CAN AND ROLLER PAN

Roger Gunderson, 33191 Paseo Mono, San Juan Capistrano, Calif. 92675

Filed Jan. 2, 1990, Ser. No. 459,971
Int. Cl.[5] B65D *25/00*
U.S. Cl. 220—90 **8 Claims**



1. An integral paint can/roller pan which serves the functions of storing a volume of paint in a first configuration and serving as a roller pan in a second configuration, comprising:

a paint can base;

a peripheral channel about the upper surface of said paint can base; and

a lid, said lid having a first and second surface;

wherein said lid may be configured in the first configuration wherein said lid is secured against and seals paint within the paint can base, and a second configuration wherein said lid is engagable to said peripheral channel such that said lid extends upwardly from said paint can base to receive a roller brush.

4,928,844

PRESSURE RELEASE FOR CARBONATED BEVERAGE CONTAINERS

Robert L. LaBarge, Ben Avon Borough, Pa., assignor to Alaminum Company of America, Pittsburgh, Pa.

Filed Apr. 14, 1989, Ser. No. 338,311
Int. Cl.[5] B65D *51/16*
U.S. Cl. 220—207 **15 Claims**

1. A sheet metal end closure for a container comprising:

a generally planar wall portion having a peripheral chime for securement to a container body,

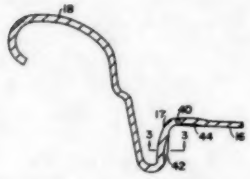
a peripheral countersink defining wall disposed immediately inward of said peripheral chime,

an integral, score line defined, opening panel,

a second score line defining a deformation inducible fracture line disposed in closely spaced adjacent relation with a portion of said countersink defining wall, and

a shallow outwardly directed buckle inducing indentation in said countersink defining wall located adjacent to said

second score line to promote initiation of pressure induced buckling of said countersink defining wall thereat and a concentration of buckle created fracture inducing forces at said second score line.



4,928,845

END FACE WITH TEAR-OFF LIP CLOSURE FOR PRESSURIZED CONTAINER

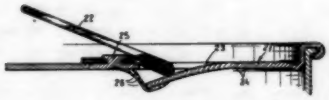
Michael J. M. Doyle, Warmoesstraat 16P, 1012 3D Amsterdam, Netherlands

Filed Oct. 18, 1988, Ser. No. 259,258

Claims priority, application Netherlands, Oct. 19, 1987, 8705497

Int. Cl.[5] B65D *51/16*

U.S. Cl. 220—271 **9 Claims**



1. End face for a can which can be under excess pressure on the inside and which is provided with a tear-away lip closure, provided with a throttle device for controlled release of the excess pressure on tearing open the lip closure characterized in that the throttle device is connected to the inner region of the end face close to the section of the lip closure which is torn open first, and also to the region of the lip closure bordering said end face section so as to provide a seal.

4,928,846

PAINT CAN CONSTRUCTION

John A. Murrin, Jr., 30 Clark St. Extension, Randolph, Mass. 02368

Filed Feb. 16, 1989, Ser. No. 310,888

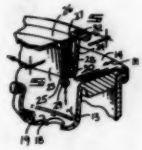
Int. Cl.[5] B65D *25/00*

U.S. Cl. 220—354 **7 Claims**

1. A paint can construction comprising:

a container formed with an annular trough formed about an opening of the container wherein the trough is defined by an interior outwardly slanting wall spaced radially inwardly of an exterior inwardly slanting wall, each wall including an upper end and a lower end wherein the walls are joined together at their lower ends by a trough floor, the trough floor including a series of through-extending apertures therethrough, the trough is further defined by a first diameter defined by the upper end of the exterior wall formed symmetrically about the opening of the container, and

a lid formed with a downwardly extending rib defining a lid trough therewithin wherein said rib includes an interior lid wall and exterior lid wall with a connecting lid floor of complementary configuration to said annular trough and defined by a diameter equal to said first diameter, and



wherein the lid trough includes a series of downwardly extending rods extending through the lid floor, and

wherein said downwardly extending rods are commonly joined at upper terminal ends thereof by an annular ring orthogonally and fixedly secured to said rods and overlying said lid trough.

4,928,847

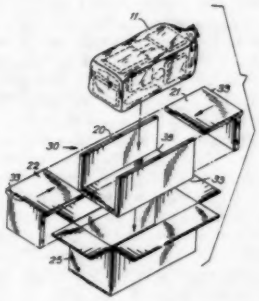
APPARATUS FOR PACKAGING REFRIGERATED GOODS

David S. Hollander, 2083 Parson St., Brooklyn, N.Y. 11234, and Mark S. Rubenstein, 208 Cinder Rd., Edison, N.J. 08820

Filed Jun. 8, 1988, Ser. No. 203,943

Int. Cl.[5] B65D *77/00, 30/00*

U.S. Cl. 220—408 **10 Claims**



1. A chill box adapted to provide insulated packaging for refrigerated goods, comprising:

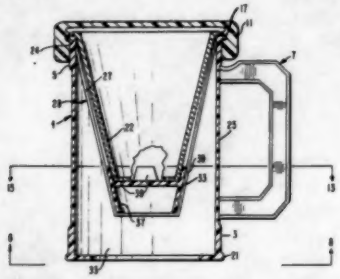
a plurality of separate portions, each portion having at least two panels and a bendable corner edge therebetween, each of said panels having foils on its top and bottom surfaces and covering its edges and an insulating material disposed therebetween to insulate refrigerated goods packaged within said chill box, said insulating material being formed by application of cured polyurethane foam to created air space between said foils.

4,928,848

COMBINATION DRINKING VESSEL AND CUP HOLDER WITH CONVERTIBLE CAP/COASTER

John A. Ballway, 93 North Stoughton Street, Bergenfield, N.J. 07621

Filed Mar. 20, 1989, Ser. No. 326,157
Int. Cl.[5] A47G 19/22, 23/02, 23/03; A41J 41/00
U.S. Cl. 220—444 **22 Claims**



22. A drinking vessel providing for both drinking directly therefrom, or use as a cup holder, comprising:

a cylindrically shaped outer container having an open top, and an open bottom;

outwardly projecting first and second band-like flanges about the upper most and lowermost portions of the outside wall of said outer container, respectively;

a first rolled over lip projecting from the topmost portion of the first flange;

a second rolled over lip projecting from the lowermost portion of said second flange;

a truncated conically shaped inner container having downwardly converging side wall terminating at a closed bottom, the outside uppermost circumferential wall portion thereof being rigidly attached to the topmost circumferential inside wall portion of such outer container;

said inner container serving to either contain fluid, or a relatively large drinking cup dimensioned to be received snugly therein, so that the lip of said cup is juxtaposed to said first lip of said outer container;

a handle rigidly attached to the outside wall of said outer container;

a cap including interior juxtaposed uppermost and lowermost juxtaposed circumferential grooves, separated by a circumferential rim therebetween, said lowermost groove serving to snap lock onto said first lip for securing said cap to the top of said outer container, said rim limiting the extent said cap can be pushed downupon the top of said outer container, the combination of said rim, and the area provided by said uppermost groove, protecting a lip or top portion of a cup held within said inner container;

said cap serving as a coaster via said lowermost groove being snap locked over said second lip, for securing said cap to the bottom of said outer container;

said cap including on its top surface a through hole for receiving a straw therethrough into said inner container, and sealing means for effectively sealing said through hole when not in use;

truncated cone-shaped inserts dimensioned to fit snugly within a lower portion of said inner container at a predetermined level relative to a relatively smaller drinking cup, for permitting said smaller drinking cup to be contained within said inner container, with a lip of said drinking cup juxtaposed to said first lip, thereby permitting different size drinking cups to be stored within said inner container in a manner facilitating direct drinking therefrom, said inserts including a plurality of upwardly projecting tabs evenly spaced about the circumference of said inserts for snugly receiving the lower portion of a cup therebetween, with the bottom of said cup resting on a bottom of said insert; and

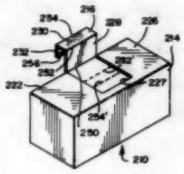
thermal insulating material filling the space within said outer container not occupied by said inner container, for maintaining fluids kept in said inner container at a given temperature for extended periods of time.

4,928,849

SHOE COVER PACKAGE

Bahram Khozai, 4701 Kenmore Ave., #904, Alexandria, Va. 22304

Filed Sep. 20, 1988, Ser. No. 246,717
Int. Cl.[5] B65D 85/18
U.S. Cl. 221—45 **4 Claims**



1. A package of disposable shoe covers comprising in combination a dispensing container with hanging means formed as an integral part thereof and extending therefrom and a series of shoe covers enclosed within said container with:

a. said container being made of cardboard thus suitable for discarding after contents of said container have been dispensed and including at least a front wall, a rear wall, a bottom wall, and an upper wall enclosing said shoe covers;

b. said hanging means being formed originally as part of said upper wall and including at least a first generally vertical portion extending upwardly from said rear wall above said upper wall to an intermediate generally horizontal portion, said intermediate portion extending rearwardly from said first portion at the upper extremity of said first portion, and a second generally vertical portion extending downwardly from said intermediate portion at the rearward edge of said intermediate portion, said hanging means also including a first hinge line between said first generally vertical portion and said rear wall, a second hinge line between said intermediate portion and said first generally vertical portion, and a third hinge line between said intermediate portion and said second generally vertical portion, said second generally vertical portion having a coating of adhesive or gum on its surface for adhering contact with a door with no adhesive being on other portions of said hanging means, said intermediate portion extending for a distance of at least the thickness of conventional doors so that said package may be suspended or hung thereby from the upper end of a door and permit the door to open and close without interference between said container and any entrance frame for the door;

c. said container also including an opening adjacent said bottom wall through which said shoe covers may be dispensed; and

d. said series of shoe covers being made of flexible plastic material or the like and interrelated with each other in such manner that each shoe cover of said series may be dispensed individually and consecutively through said dispensing opening from said container.

4,928,850

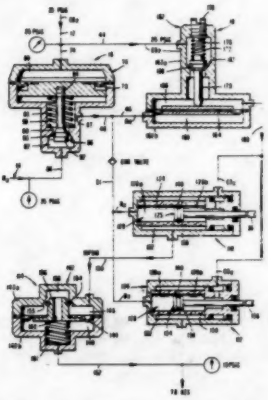
GAS BLENDING APPARATUS

Merton R. Fallon, Woodland Hills, Calif., and Thomas W. Clements, Ambler, Pa., assignors to McDantim, Inc., Woodland Hills, Calif.

Continuation-in-part of Ser. No. 201,002, Jun. 1, 1988, Pat. No. 4,874,116. This application May 2, 1989, Ser. No. 346,538

Int. Cl.[5] B67B *7/24*

U.S. Cl. 222—3 **7 Claims**



1. An apparatus for supplying a gaseous mixture to an external system on demand, comprising:

(a) a source of a first gas under pressure;

(b) a source of a second gas under pressure;

(c) a gas blanding means in communication with the external system and in communication with said sources of said first and second gases for adjustably blending said gases into a gaseous mixture of pre-determined proportions and for supplying said gaseous mixture to the external system on demand, said gas blending means comprising a high flow rate stage and a low flow rate stage;

(d) pneumatic rely means in communication with said high flow rate and low flow rate stages of said gas blending means and said sources of said first and second gases for supplying said second gas to said gas blending means on the demand of the external system, said pneumatic rely means including first valving means operable by said first gas under pressure for controlling the flow of said second gas to said gas blending means upon the demand of the external system;

(e) differential pressure control means in communication with said high flow rate stage of said gas blending means and with said external system for controlling the flow of gases between said high flow rate stage and said external system; and

(f) control means in communication with said sources of said first and second gases for controlling the flow of said first gas to said pneumatic rely means, said control means including second valving means operable by said second gas under a predetermined elevated pressure for controlling the flow of said first gas to said pneumatic rely means.

4,928,851

TUBE CONTENTS EXPULSION SLEEVE

Pauline C. Eatherly, 12528 Kenobi Ct., Cerritos, Calif. 90701

Continuation of Ser. No. 115,817, Nov. 2, 1987, abandoned. This application Jan. 23, 1989, Ser. No. 300,169

Int. Cl.[5] B65D *35/28*

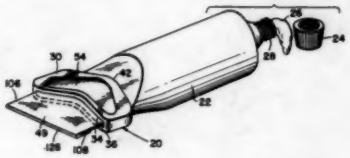
U.S. Cl. 222—103 **11 Claims**

1. A sleeve for use with a container tube for movement in a direction longitudinal of the tube to assist in removing contents from the tube, the sleeve including:

first and second arrowhead shaped sides, each of said sides having a leading edge having a centrally located nose;

an outer surface with manual grip enhancement means thereon;

the sleeve being deformable by manual pressure on the grip enhancement means to assist in expressing contents from the tube;



an inner surface having at least one upstanding land thereon, said land having a central portion extending at least a substantial portion of the length of the sleeve longitudinal of the tube, the outer portions of the land extending a substantially less distance than the central portion; and

first and second opposite edges connecting said first and second sides together in a closely spaced relationship.

4,928,852

CONTAINER OF FLEXIBLE MATERIAL FOR RECEIVING A LIQUID

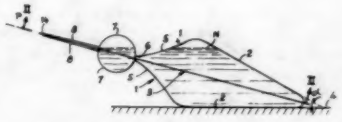
Michel Guiffary, 136 Rue Vulfran Warmé , 80000 Amiens, France

Continuation of Ser. No. 574,457, Jan. 27, 1984, abandoned. This application Aug. 21, 1986, Ser. No. 898,879

Claims priority, application France, Jan. 28, 1983, 83 01359

Int. Cl.[5] B65D *37/00*

U.S. Cl. 222—107 **5 Claims**



1. A container of a semi-rigid material for receiving a liquid, manufactured from films, by molding, thermal blowing or thermal forming, comprising:

two semi-shells, each of which includes only one planar bearing side, forming together a dihedron which has an angle less than 90° when the container contains a liquid, and each having an extended portion opposite the apex of said dihedron to define when said shells are fixed together an extended neck having a liquid expelling opening at the outer end thereof, said container resting on only one of said sides when placed on a surface, said liquid expelling opening being located at a level higher than the maximum level of the liquid in said container when full and resting on one of said sides and when resting on the other of said one of said sides, so that liquid cannot accidentally flow out of said container; and

means for fixing said semi-shells with each other along their peripheries in a meridian plane relative to which said semi-shells are symmetrical.

4,928,853

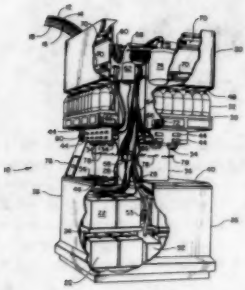
END AISLE FLUID MIXING AND DISPENSING SYSTEM

William R. Isham, Farmington; E. Brent Cragun, Mountain Green, both of Utah; Christopher Gault, Middletown, Wis., and William J. Wermeling, Wilton, Conn., assignors to Fountain Fresh, Inc., Salt Lake City, Utah

Filed Aug. 19, 1988, Ser. No. 234,174

Int. Cl.[5] B67D *1/16, 5/56, 5/62*

U.S. Cl. 222—108 **46 Claims**



1. A self-contained apparatus for preparing, mixing, and dispensing liquid mixtures comprising:

a cabinet;

a framework enclosed by said cabinet and having an upper portion, a center portion and a lower portion;

a source of at least one first liquid component of said liquid mixture carried on said framework;

means for supplying to said apparatus at least one second liquid component of said liquid mixture from a source remote from said apparatus;

means carried by said framework for mixing said components of the mixture;

means carried by said framework for dispensing the mixture into a container outside said cabinet;

means disposed within said framework for collecting excess liquid mixture and liquid waste generated during mixing and dispensing; and

means for removing excess liquid mixture and liquid waste from said collecting means, said means for removing extending and moving said liquids from said means for collecting to and through the upper portion of the framework.

4,928,854

SUPERFLOW DIFFUSER AND SPOUT ASSEMBLY

Gerald P. McCann, Los Angeles, and Andrew J. Holoubek, Burbank, both of Calif., assignors to Mc Cann's Engineering and Manufacturing and Co., Los Angeles, Calif.

Filed May 19, 1988, Ser. No. 195,947

Int. Cl.[5] B67D *5/56*; B05B *15/02*

U.S. Cl. 222—129.1 **19 Claims**

19. A dispensing apparatus including a superflow diffuser and spout assembly, comprising:

a valve body,

a diluent inlet in said valve body,

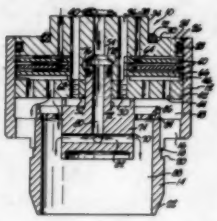
a beverage concentrate inlet in said valve body,

a spout attached to said valve body,

a beverage concentrate distributor in fluid communication with said beverage concentrate inlet, said beverage concentrate distributor adapted to direct beverage concentrate into said spout,

a diffuser, said diffuser in fluid communication with said diluent inlet,

a flow separator, said flow separator in fluid communication with said diluent inlet, said flow separator adapted to direct a first portion of diluent along an outside surface of



said spout, said flow separator adapted to direct a second portion of diluent into said spout.

4,928,855

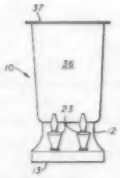
DISPENSER APPARATUS FOR BEVERAGE BOTTLES

John A. Ramsey, 14831 Easingwold, Houston, Tex. 77015

Filed Aug. 1, 1988, Ser. No. 226,865

Int. Cl.[5] B67D *5/60*

U.S. Cl. 222—131 **11 Claims**



1. A dispensing apparatus, for large size bottles for carbonated beverages having open tops normally closed by screw top closures, comprising

a supporting base having a top surface with at least one vertical, female-threaded, opening comprising a removable tubular female-threaded insert configured to receive and hermetically seal the open, male-threaded, end of a large size carbonated beverage bottle in an inverted position, and a least one horizontal front opening,

a short vertical passageway in said base extending from said top opening,

a horizontal passageway extending from said front opening to open into said vertical passageway,

a bleed passageway extending horizontally substantially in parallel to said horizontal passageway from said front opening and then vertically through said vertical opening to a point adjacent to the bottom of an inverted carbonated beverage bottle when installed thereon,

valve means supported on said base and connected to said horizontal passageway and said bleed passageway operable to open and close said passageways simultaneously to bleed air into a bottle installed thereon and permit flow of a beverage out of the bottle through said front opening,

a removable cover supported on said base in an inverted position of a size and shape for enclosing a bottle supported on said base,

said removable cover being of a hollow construction fitting over said base and having a removable top closure usable as a serving container.

4,928,856

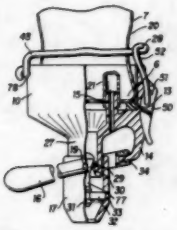
BOTTLED WATER DISPENSING SYSTEM

Jonathan Z. White, 2208 Falcon Hill Pl., Lynchburg, Va. 24503

Continuation-in-part of Ser. No. 25,210, Mar. 11, 1987, abandoned. This application Mar. 3, 1988, Ser. No. 160,353

Int. Cl.[5] B67D *3/00*

U.S. Cl. 222—174 **12 Claims**



1. In combination:

(a) a fluid dispenser comprising an articulable valve member normally biased in the closed position,

(b) closure means to secure and seal said dispenser removably to a container having a bottom, wall, mouth, and neck,

(c) supporting means to suspend said container securely in an inverted position, allowing access to and manipulation of said dispenser,

(d) a vent comprising a vent tube leading from the atmosphere at said dispenser to an interior position near the container bottom,

(e) a flow tube, comprising a tubular opening through said closure means to the interior of said container,

(f) a coaxial valve seat on the inner wall of said flow tube,

(g) a valve member bearing in coaxial sealing contact with said valve seat on the container side of the valve seat, said valve member having diameters in decreasing graduation as it extends outwardly through the valve seat,

(h) a stem of lesser cross-sectional area, in coaxial attachment and adapted to actuate said valve member by moving it from sealing contact inwardly,

(i) a sleeve, surrounding and extending beyond the outer end of said flow tube and having a common axis therewith, with clearance for air passage between sleeve and flow tube,

(j) coupling means interior to said sleeve, to flexibly fasten the outer end of said stem central to the sleeve, allowing resilient angular displacement of stem from the common axis of sleeve and flow tube,

(k) operator means adapted to reciprocally actuate said sleeve, comprising a handle pivotally fixed at one end to said closure means, and further fixed in pivotal contact intermediate the ends, on a diametral axis of said sleeve.

4,928,857

HAND OPERATED SOAP DISPENSER

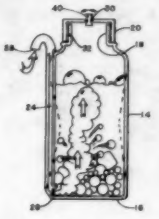
Frederick K. Ecker, 8402 Shady Glen Dr., Orlando, Fla. 32819

Filed May 15, 1987, Ser. No. 50,043

Int. Cl.[5] B65D *37/00*

U.S. Cl. 222—211 **8 Claims**

1. A hand operated device for dispensing a solution, comprising a dispenser container having generally cylindrically configured sidewalls of resilient material, and a fill opening at the top equipped with a closure cap, the sidewalls of said container being constructed of non-rigid material that can be readily squeezed by a user, said container having a dispensing passage, with the inlet for said dispensing passage being operatively connected near the bottom interior of said container, and the discharge opening from said dispensing passage located adjacent an upper portion of said container and being non-valved, a plurality of non-floating beads residing in a bottom portion of said container, which beads are surrounded by solution, the deformation of said sidewalls at the time of being squeezed inwardly by the user causing said beads to undergo a



significant amount of motion, and also causing the dispensing of a quantity of the solution from said dispensing passage, such motion of the beads serving to break up and disperse any lumps of material existing in said container.

4,928,858

METERING DEVICE FOR SEED OR FERTILIZER

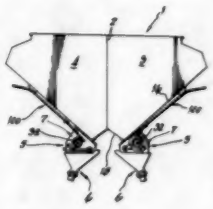
Raymond C. Tite, Coventry, United Kingdom, assignor to Massey-Ferguson Services N.V., Curacao, Netherlands

Continuation of Ser. No. 871,395, Apr. 17, 1986, abandoned. This application Apr. 22, 1988, Ser. No. 184,928

Claims priority, application United Kingdom, Aug. 22, 1984, 8421337

Int. Cl.[5] B65D *88/54*

U.S. Cl. 222—312 **23 Claims**



2. A metering comprising a housing having a pair of side walls each formed with an open slot, a feed roll and cut-off member mounted on a rotary drive shaft that extends through said slots transversely of said side walls with the feed roll located for axial movement in one of said slots and the cut-off member located for axial movement in the other of said slots, a rotary sealing means located in said one slot to seal around the slot between the side wall and the feed roll so as to allow rotation and axial movement of the feed roll relative to the side wall, and a cut-off flap connected with an external control lever and pivotally mounted within the housing to co-operate with the feed roll and cut-off member so as to control metering, said slots vertically supporting said feed roll, cut-off member and drive shaft but allowing removal of these members in a direction laterally of said drive shaft, and a closure member pivotally connected to the housing and having side wall potions that co-operate with the side walls of the housing to close said slots and encircle the rotary sealing means and cut-off member to hold them radially captive but allow said axial movement of both the feed roll and cut-off member in their respective slots, the control lever being selectively co-operable with stop means on the closure member to hold the control lever in any one of a plurality of angular positions relative to

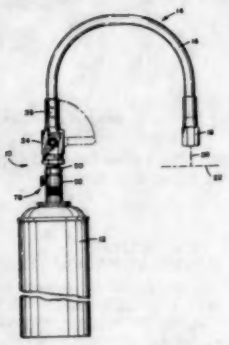
the housing to provide variable control of the metering and to hold the closure member in position closing the slots.

4,928,859

QUICK DISCONNECT FOR AEROSOL SPRAY CAN

Roy J. Krahn, 3870 E. County Line Rd., Birchwood, Minn. 55110, and Brian J. Blenkush, 9921 96th Pl., Maple Grove, Minn. 55369

Filed Oct. 28, 1988, Ser. No. 263,717
Int. Cl.[5] B05B *7/24*
U.S. Cl. 222—402.14 **20 Claims**



1. A quick connect/disconnect assembly for coupling a line to a source of fluid under pressure having a port with a normally closed valve therein, comprising:

an insert having a threaded portion at one end for connection to the line, a cylindrical male portion at the other end, and an axial first fluid passage extending therebetween;

a hollow actuator pin positioned in the first fluid passage and extending axially outward from the male end of said insert for extension through the port of the fluid source and engagement with the valve therein;

an adapter having a cylindrical female portion at one end for receiving said insert, a threaded portion at the other end for connection to the port of the fluid source, and an axial second fluid passage extending therebetween;

seal means within the second fluid passage of said adapter for defining a sealed connection between said insert, said adapter, and the fluid source upon insertion of said insert into said adapter;

slide means mounted on the female end of said adapter for transverse movement into and out of locking engagement with a groove on the male end of said insert; and

means for normally biasing said slide means into locking engagement with the groove on said insert.

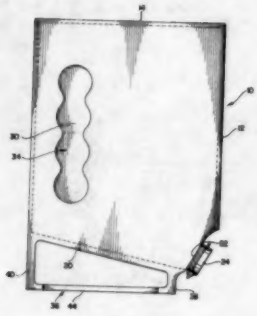
4,928,860

DISPENSING CONTAINER

Jeffrey J. Knight, 426 Fairgrounds Rd., West Kingston, R.I. 02892

Filed Jan. 23, 1989, Ser. No. 300,512
Int. Cl.[5] A47G *19/14*
U.S. Cl. 222—466 **7 Claims**

1. A dispensing container for assuring complete drainage of liquids especially slow flow liquids contained therein, said container having a bottom wall for normally supporting said container in a first non-dispensing upright position, side walls extending upwardly therefrom and a connecting top wall, a dispensing opening and closure disposed in said top wall proximal one side thereof, said top wall evenly sloping downwardly in a generally straight line from said one side proximal to said dispensing opening to the top wall side opposite said one side, and an upper support spaced above said top wall and having an upper generally flat supporting surface generally parallel to said bottom wall such that liquid drains by gravity from said



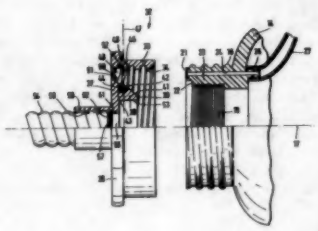
top wall to said opening when said container is supported in an inverted alternate dispensing position by said upper supporting surface.

4,928,861

PLASTIC-CANISTER SCREW CLOSURE

Wolfram Schiemann, Eugen-Nagele-Strasse 17, 7140 Ludwigsburg, Fed. Rep. of Germany

Filed Jan. 6, 1989, Ser. No. 295,052
Int. Cl.[5] B67D *3/00*
U.S. Cl. 222—481.5 **20 Claims**



1. In a screw closure for a plastic canister, the plastic canister having a pouring nozzle that bears an external screw thread and one air venting through hole in a wall of the pouring nozzle, which opens into an end face of the pouring nozzle and leads to inside the canister,

the screw closure comprising

a screw closure shroud with an internal thread complementary to the external screw thread on the plastic canister and coaxial to a geometrical longitudinal axis of the screw closure,

a screw closure bottom substantially perpendicular to the geometrical longitudinal axis,

a coaxial annular wall having an outer wall region, emerging from the bottom and extending a distance shorter than the shroud,

a coaxial sealing ring with an inner region held in defined contact by the outer wall region of the annular wall, and defining a sealing plane for the pouring nozzle, the improvement wherein

(a) the annular wall resists radial forces from deforming the pouring nozzle,

(b) on the far side of the sealing ring relative to the sealing plane, the screw closure bottom has an annular channel that is arranged coaxially, is open away from the screw

closure bottom and extends widthwise between the annular wall and the shroud,

(c) at least one through air hole is provided in the screw closure bottom and is positioned within the annular channel,

(d) a liquid outflow hole is provided in the screw closure bottom within the annular wall,

(e) downstream of the liquid outflow hole, a flexible pouring spout is connected in liquid-tight manner to the screw closure,

(f) in a screwed-on position the sealing ring engages with an inner surface of the pouring nozzle, and

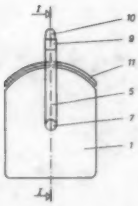
(g) the annular channel is defined between an inner surface of the shroud and the outer wall region of the annular wall and communicates with the air venting through hole.

4,928,862

TILTABLE LADLE AND COVER FOR SUCH LADLE

Douglas S. White, Cap D'Antibes, France, assignor to Elkem a/s, Norway

Filed Jun. 23, 1989, Ser. No. 371,282
Claims priority, application Norway, Aug. 4, 1988, 883455
Int. Cl.[5] B22D *41/04*
U.S. Cl. 222—604 **4 Claims**



1. In a tiltable ladle having a cover and a suspension frame said suspension frame comprising two lifting arms rotatably connected to trunnions affixed to the outside of the wall of the ladle and a horizontal beam above the ladle equipped with a hook, the improvement comprising the top of the ladle and the ladle cover are formed as segments of a cylinder, the focal axis at these cylinder segments being the pivotal axis at the ladle, and that the cover being affixed to the suspension frame.

4,928,863

BICYCLE RACK FOR CARRYING SPORT BOARDS

Robert D. Morgan, 1539 Jay St., Carpinteria, Calif. 93013

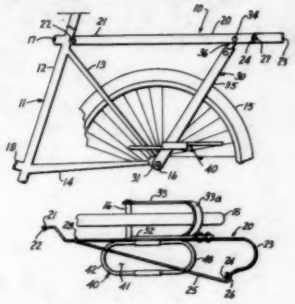
Filed Feb. 6, 1989, Ser. No. 307,106
Int. Cl.[5] B62J *11/00*
U.S. Cl. 224—39 **10 Claims**

1. In combination:

a bicycle frame providing a structural support and also providing a mount for a rear wheel, and;

a bicycle rack comprising a retainer member having a first end pivotally attached to said frame at a first point, a U-shaped bend spaced from said first point and a free end on said bend, and an elastic strap attached to said retainer member at a point between its ends, and to the said free end of said ends being detachably to said retainer member; a strut rotatably pivotally mounted to said frame at a second point, and rotatably mounted to said retainer member at a third point, said strut including adjustment means enabling its length adjustably to be changed; and a pocket member attached to said strut forming an open loop to receive an end of a sport board;

whereby said bicycle rack can be adjusted to said frame to place the retainer member substantially horizontally on said frame by adjusting the length of the strut with said adjustment means, and whereby a sport board can be carried by said rack, by releasing said elastic cord to exert



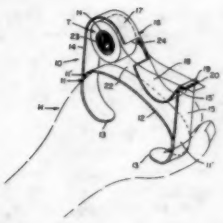
a retentive force on the board pressing it toward the retainer member and into the bend.

4,928,864

HAND CLASP TAPE DISPENSER

Jerry Walker, and Troy Waddell, both of P.O. Box 1164, Hereford, Tex. 79045

Filed Aug. 22, 1988, Ser. No. 234,637
Int. Cl.[5] B26F *3/02*
U.S. Cl. 224—162 **8 Claims**



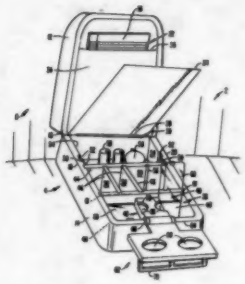
1. A tape dispenser for selectively severing a free end of tape from a tape supply reel and which dispenser is worn along the back, sides and palm of an individual's hand so as to extend between the thumb and forefinger comprising a base member, said base member including an intermediate arcuate portion and spaced opposing outermost portions, said base member being of a size to at least extend along the back and sides of an individual's hand with said intermediate portion being generally continuously engageable with the back of an individual's hand, a housing mounted to said base member and extending outwardly with respect to said intermediate portion thereof, said housing including a pair of spaced end walls, a tape supply reel support means carried by said housing adjacent one of said end walls, and a cutter means spaced from said tape supply reel support means and adjacent the other of said end walls whereby said dispenser may be positioned about an individual's hand so that the housing extends from the back of the individual's hand so that the thumb and fingers are free for normal manipulation.

4,928,865

BILATERAL BEVERAGE CONTAINER HOLDER

Brian S. Lorence, Warren; Richard A. Phelps, Ferndale, and David N. Grabowski, Rochester Hills, all of Mich., assignors to Chivas Products Limited, Sterling Heights, Mich.

Filed Mar. 3, 1989, Ser. No. 318,306
Int. Cl.[5] A47C 7/62
U.S. Cl. 224—275 19 Claims



1. A vehicle arm rest for use with a beverage container, comprising:

a lower member defining an interior therein;

an upper member hinged to the lower member for movement between an open position, providing access to the interior, and a closed position, substantially covering the interior; and

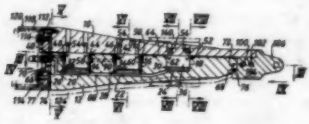
a bilateral beverage holder, hingedly attached to the lower member for movement between first and second positions, the first position being vertically aligned with a portion of the interior, the second position being vertically offset from the interior, the bilateral beverage holder including a tray member movable with said bilateral beverage holder between the first and second positions, said tray member defining an opening for receiving a beverage container when the tray member is in either the first or second positions.

4,928,866

PIPE BURSTER

Alec R. Carruthers, Bratton, England, assignor to British Gas plc, London, England

Filed Jan. 11, 1989, Ser. No. 299,544
Claims priority, application United Kingdom, Jan. 12, 1988, 8800597
Int. Cl.[5] F16L 55/18
U.S. Cl. 225—106 6 Claims



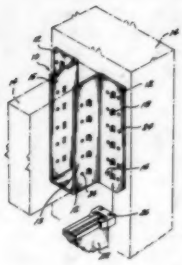
1. A pipe burster comprising an elongated body in two parts extending in the lengthwise direction of the body, the two parts being mutually guided by guide surfaces so as to be capable of relative rectilinear separating and approach movements transversely to said direction, hydraulic piston-and-cylinder means spaced apart along the body being operable in unison to effect at least said separating movement.

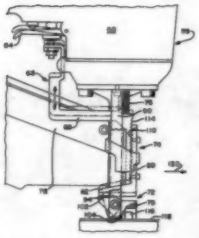
4,928,867

SYSTEM FOR POSITIONING FASTENERS

Mark B. Jensen, 1656 N. Sunview, Mesa, Ariz. 85205

Continuation-in-part of Ser. No. 135,605, Dec. 21, 1987, abandoned. This application Jun. 30, 1989, Ser. No. 376,207
Int. Cl.[5] B25C 1/00, 7/00
U.S. Cl. 227—7 35 Claims





1. A tool for driving fasteners through a predetermined position on a connector, the connector having one or more tab members projecting above a top surface on the connector, the tool comprising:

means for ejecting a fastener from the tool; and

means for triggering said ejecting means, said triggering means including a follower means that cooperates with the one or more tab members on the connector to activate said ejecting means to eject a fastener from the tool and through the predetermined position on the connector.

4. A connector for positioning fasteners that are driven by a powered fastener tool, the tool being activated by a trigger mechanism to eject a fastener therefrom, the connector comprising:

at least one wall, said at least one wall having a top surface on which the powered fastener tool is placed and a back surface on which structural members bear against; and

means on said top surface for aligning the powered fastener tool with a predetermined position on said at least one wall when the powered fastener tool is brought into engagement with said aligning means.

4,928,868

FASTENER DRIVING TOOL

James E. Kerrigan, Des Plaines, Ill., assignor to Duo-Fast Corporation, Franklin Park, Ill.

Filed Mar. 17, 1983, Ser. No. 476,321
Int. Cl.[5] B25L 1/00
U.S. Cl. 227—131 35 Claims

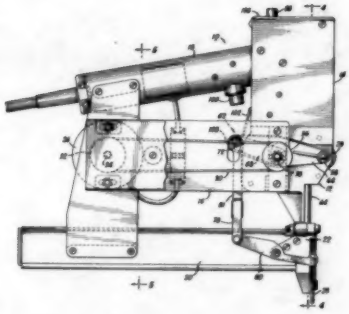
1. A tool for driving impact driven fasteners into a workpiece comprising:

a housing;

a ram having a metal surface disposed within said housing and mounted for reciprocation between an upper and a lower position within said housing;

a motor mounted to said housing;

a flywheel having a metal peripheral surface which is adapted to directly contact said metal surface of said ram, mounted to said housing and rotated by said motor for developing a predetermined amount of energy in said flywheel sufficient to drive a fastener into the workpiece; and



means for effecting metal to metal contact between the metal surface of said ram and the metal peripheral surface of said already rotating flywheel thereby to drive said ram into engagement with a fastener wherein energy stored in said flywheel is transferred to said ram to drive said fastener into said workpiece and wherein the metal surface of the ram and the metal peripheral surface of the flywheel are fabricated from steel.

4,928,869

SOLDER LEVELLER

Peter P. A. Lymn, Lime Kiln Cottage, Burlton, Petersfield, Hampshire, United Kingdom (GU31 5SJ)

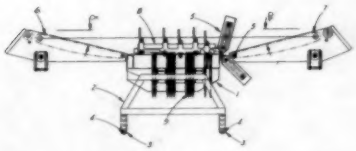
PCT No. PCT/GB87/00367, § 371 Date Nov. 25, 1988, § 102(e) Date Nov. 25, 1988, PCT Pub. No. WO87/07196, PCT Pub. Date Dec. 3, 1987

PCT Filed May 27, 1987, Ser. No. 282,313

Claims priority, application United Kingdom, May 29, 1986, 8613105

Int. Cl.[5] B23K *3/06, 1/08*

U.S. Cl. 228—20 **25 Claims**



1. A solder leveller having a bath for containing molten solder with a free surface, said solder leveller including:

curved-path defining rollers arranged across said bath to define a curved portion of a board path through said solder leveller;

at least two of said curved-path defining rollers comprising a pair of superimposed, biased together, board-gripping rollers having a nip therebetween beneath said free surface of said molten solder at which the board (B) is gripped for drive;

means for rotational drive of at least one of said pair of board-gripping rollers;

means for levelling solder deposited on a board (B) as it leaves said bath; and

means for providing a layer of solder-oxidation-inhibiting oil over said molten solder in said bath, said means including a sump from which said oil is pumped onto said molten solder and a weir over which said oil flows back to said sump to regulate depth of said oil over said molten solder, said nip of said pair of said board-gripping rollers being below the level of said weir;

said board path having:

an upstream portion above the free surface of the molten solder leading to,

the curved, board-heating and tinning portion below the surface of the solder, including said nips of the or each said pair of board-gripping rollers at which the board is gripped and leading to,

a downstream portion above the free surface of the solder leading to said levelling means.

4,928,870

PROCESS FOR JOINING CERAMIC PARTS WITH A REACTIVE CONDUCTING MATERIAL

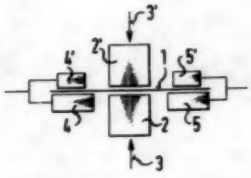
Martin Gut-Liquornik, and Aristides Naoumidis, both of Julich, Fed. Rep. of Germany, assignors to Kernforschungsanlage Julich Gesellschaft mit beschränkter Haftung, Julich, Fed. Rep. of Germany

Filed Jun. 6, 1989, Ser. No. 362,274

Claims priority, application Fed. Rep. of Germany, Jun. 16, 1988, 3820459

Int. Cl.[5] B23K *11/00, 11/16*

U.S. Cl. 228—107 **11 Claims**



1. A thermal bonding process for joining ceramic parts which does not require an inert surrounding atmosphere, comprising the steps of:

cleaning and polishing respective surfaces at which two ceramic parts are to be joined;

fitting together said parts at said surfaces with insertion of between said surfaces a conducting material in a form selected from the group consisting of foils, wire arrays, webs and mats in each case of a thickness not exceeding 50 μm, said conducting material being selected from the group consisting of graphite and metallic materials;

connecting said conducting material, by portions thereof accessible in the vicinity of boundaries of said fitted-together surfaces, into an electric circuit for passage of electric current through said conducting material interposed between said surfaces, and

subjecting said conducting material to electric and thermal shock by passing therethrough an intense pulse of electric current of less than 100 microseconds duration, of such intensity that said conducting material interposed between said surfaces, as well as said surfaces are heated to reactive bonding temperature for said surfaces and of such brevity that said ceramic parts do not absorb enough energy through said surfaces to lower the bonding temperature and reaction of said conducting material with a surrounding atmosphere is likewise inhibited.

4,928,871

APPARATUS AND METHOD OF CONTROLLED FEED OF A BONDING WIRE TO THE "WEDGE" OF A BONDING HEAD

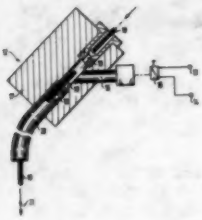
Farhad Farassat, Munich, Fed. Rep. of Germany, assignor to Emhart Deutschland GmbH, Oberhaching, Fed. Rep. of Germany

Filed Feb. 22, 1989, Ser. No. 314,191

Claims priority, application Fed. Rep. of Germany, Feb. 23, 1988, 3805584; Jul. 26, 1988, 3825373

Int. Cl.[5] H05K *13/06*

U.S. Cl. 228—179 **14 Claims**



1. Apparatus for the controlled feed of a bonding wire, specifically a golden bonding wire, to the wedge or the capillary tube of a bonding head which may be traversed up and down, comprising a abonding wire guide duct which is disposed ahead of said wedge or said bonding capillary tube, a fluid pipe opening into said capillary tube, a vacuum source capable of being placed in fluid communication with said fluid pipe, an air blast source capable of being placed in fluid communication with said fluid pipe, and means for controlling whether said vacuum source or said air blast source is in fluid communication with said fluid pipe.

13. Method for controlled feed of a bonding wire, specifically a golden bonding wire, to the wedge or the capillary tube of a bonding head which may be traversed up and down comprising the following steps of operation:

(a) lowering said bonding head from an initial or starting position, while carrying along said bonding wire by means of a clamping means disposed at said bonding head and movable along with said bonding head, while the bonding wire is transported against the effects of a coaxial fluid stream and/or slip clamp which maintains a slight traction of the bonding wire, while a "ball" is formed at the free end of said bonding wire either previously or simultaneously;

(b) performing a "touch-down" operation with ultrasonic excitation of said capillary tube as well as opening of said bonding head clamp shortly before "touch-down", and formation of a first bond pad;

(c) raising the bonding head up to a defined loop height, preferably while opening said slip claim, and, whatever required, with closure or change-over of said coaxial fluid flow;

(d) positioning of said second bond pad in opposition to said capillary tube lowering said bonding head while carrying along said bonding wire against the effect of the possibly reactivated coaxial fluid flow as well as of the slip clamp which is possibly closed again, up to the second "touch-down", and formation of a second bond pad under ultrasonic effect;

(e) and raising the bonding head up to a so-called "tail-length" level, with said bonding head clamp being open, preferably even with the said slip clamp being open, however with a preferably continuously effective coaxial flow, whereupon said bonding head clamp is closed again while the upward movement of said bonding head is continued until the latter's initial position will be reached, while said bonding wire is torn off.

4,928,872

METHOD OF BRAZING EMPLOYING BAG-GROUP HOMOGENEOUS MICROCRYSTALLINE BRAZING POWDERS

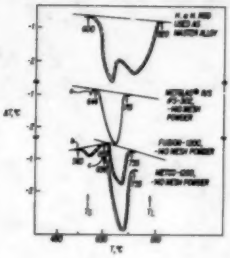
Anatol Rabinkin, Morris Plains, N.J., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.

Division of Ser. No. 97,016, Sep. 14, 1987, Pat. No. 4,842,955.

This application Mar. 6, 1989, Ser. No. 319,376

Int. Cl.[5] B23K *35/14, 35/28*

U.S. Cl. 228—203 **1 Claim**



1. A process for joining together two or more metal parts, the process comprising the steps of:

a. interposing between the parts to be joined a brazing paste comprising metal powder having a homogeneous, microcrystalline structure, a composition consisting essentially of about 15 to 40 weight percent copper, 0 to 32 weight percent zinc, 0 to 24 weight percent cadmium, 0 to 3 weight percent nickel, 0 to 10 weight percent tin, and the balance being silver and incidental impurities, and a phase structure such that the largest dimension of any precipitated phase ranges from about 0.01 to 0.1 micrometer;

b. heating to cause substantially complete melting of the metal powder; and

c. cooling the melted powder to produce a brazed joint between the parts.

4,928,873

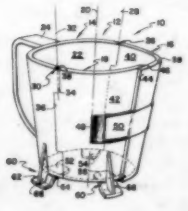
FOLDABLE CUP HOLDER

Wayne A. Johnson, P.O. Box 3400, Corpus Christi, Tex. 78463

Filed Jul. 31, 1989, Ser. No. 388,344

Int. Cl.[5] B65D *6/18*

U.S. Cl. 229—1.5 H **7 Claims**



1. A foldable cup holder comprising

a body comprising a plurality of rigid sections in a closed generally circular path and having adjacent sides, means pivotally connecting all but two of the adjacent sides

leaving a pair of pivotally movable sections providing free section ends;

separable closing means carried by the two adjacent sides for releasably securing the free section end together;

means on the sections providing a support for a cup positionable in the closed path;

means on the sections for supporting the sections on an underlying surface; and

a handle connected to one of the rigid sections.

4,928,874

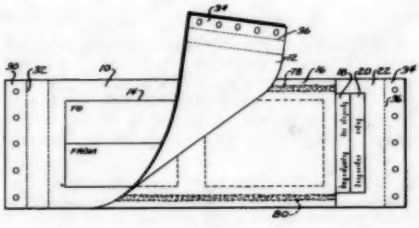
MAILER-LIKE BUSINESS FORM WITH TRANSPARENT FRONT

Paul T. Henry, Palatine; Roger L. Haase, Arlington Heights, and Gary W. Fitzgibbons, Barrington, all of Ill., assignors to Uarco Incorporated, Barrington, Ill.

Filed Nov. 8, 1989, Ser. No. 433,669

Int. Cl.[5] B65D *27/00, 27/30*

U.S. Cl. 229—74 **12 Claims**



1. A business form comprising:

a sheet of face stock having pressure sensitive adhesive on one side thereof;

a release liner removably adhered to said pressure sensitive adhesive;

a transparent sheet adhered along two spaced marginal edges to said face stock sheet on the side thereof opposite said one side with at least one marginal edge terminating short of the corresponding marginal edge of the face stock sheet and being free from adhesion thereto; and

at least one imaging data sheet between said transparent sheet and said face stock sheet and having marginal edges inward of said two marginal edges so as to be free from adhesion to said transparent sheet and said face stock sheet thereat and having a third marginal edge extending past said one marginal edge to be grippable thereat and removed from said form.

4,928,875

ECCENTRIC "Z" FOLD MAILER WITH NESTING CAPABILITIES

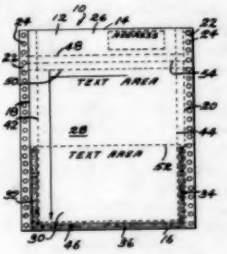
Wilbur P. Hutchinson, 318 N. School St., Mt. Prospect, Ill. 60056

Continuation of Ser. No. 81,792, Aug. 5, 1987, abandoned. This application Jan. 17, 1989, Ser. No. 298,258

Int. Cl.[5] B65D *27/00*

U.S. Cl. 229—92.1 **9 Claims**

1. A mailer comprising a sheet having front and rear surfaces and having top, bottom and side edges, the top and bottom edges parallel to one another and the side edges parallel to one another, first and second fold lines located between and parallel to the top and bottom edges, an address area between the top edge and the first fold line, a text area between the first fold line and the bottom edge, the distance between the top edge and the first fold line being substantially less than the distance between the first and second fold lines, a first strip of adhesive on the front surface adjacent one side edge between the bottom edge and the second fold line, a second strip of adhesive on the front surface adjacent the other side edge between the bottom edge and the second fold line, a third strip of adhesive on the front surface of the sheet adjacent the bottom edge, respective strips of adhesive on the rear surface adjacent to each side edge between the top edge and the first fold line, the arrangement



being such that the sheet may be Z-folded to place the text area on the inside and the address area on the outside of the mailer, and when activated the strips of adhesive will seal the mailer along the edges.

4,928,876

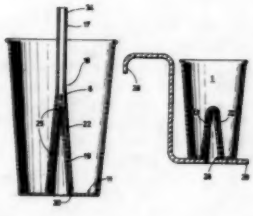
BIFRUSTOCONICAL BEVERAGE CONTAINER, LID, MULTI-SECITONAL STRAW, AND FASTENING DEVICES

Allen S. Marshall, Columbia, S.C., assignor to Brockington and Marshall, Columbia, S.C.

Filed May 11, 1989, Ser. No. 350,226

Int. Cl.[5] B65D *5/44*

U.S. Cl. 229—103.1 **14 Claims**



1. A beverage container having substantially a frustoconical hollow core external body member, wherein the core of the external body member shall be referred to as the inside, where said external body member terminates in a rim at an upper extremity and a base at the other extremity, wherein said base is contiguous with an internal body member, said internal body member forming a bottom of the beverage container, wherein said internal body member is also a functional component and a fastening means of a unique multi-sectional straw, and a component of a fastening means for temporarily attaching the beverage container to a surface, the improvement in combination therewith comprising:

a. an internal body member that is substantially a second, smaller inverted, conical hollow core frustum terminating in an apical closure at the upper extremity and open ended and fitted with a joining flange at the other extremity, where the flange integrally joins the internal body member to the base of the external body member forming, substantially, a bifrustoconical container, where the frustum of the internal body member emanates centrally, coaxially and upwardly from the inside of the base, wherein the inverted hollow core frustum results inn a beverage container having a bottom with two functional

fastening means, one fastening means for securing the container to a fastening device having a vertical fastening element, wherein fastening is affected by interpositioning the vertical fastening element within the core of the internal body member, and a second fastening means for holding upright a unique multi-sectional straw;

b. a multi-sectional straw, which rests and is superimposed on the frustum of the internal body member, wherein said multi-sectional straw is comprised of an upper substantially linear tubular section, a lower hollow core frustoconical section, and an intermediate expander section which integrally joins the tubular section to the frustoconical section, where the multi-sectional straw has an overall length that is sufficient to extend from the base of the beverage container to above the rim, where the frustoconical section of the straw is sized such that when superimposed on the frustum of the internal body member, the superimposed straw and the internal body member form a thin annular chamber between an inside surface of the core of the straw and an outside surface of the frustum of the internal body member, wherein said annular chamber enables a fluid to be conveyed, under the force of slight suction, from the inside at the base of the container upward through and out of the tubular section of the straw;

c. a closing lid which fastens to the rim of the beverage container, where said lid has a closed straw passage and an opening means, and where the passage is of sufficient size to allow an inserted straw to pass through when the passage is open.

4,928,877

METHOD OF MAKING A LAMINATED TUBULAR BODY

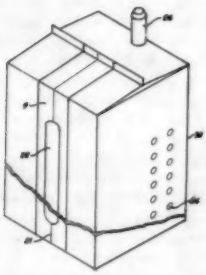
Dusan S. Lajovic, Smithfield, Australia, assignor to Impact International Pty, Ltd., Smithfield, Australia

Filed Oct. 14, 1988, Ser. No. 257,534

Claims priority, application Australia, Oct. 15, 1987, PI4901; Feb. 3, 1988, PI6552; Sep. 2, 1988, 21802/88

Int. Cl.[5] **B65D** *5/40, 5/74*

U.S. Cl. 229—125.42 **21 Claims**



1. A laminated tubular body comprising an outer layer having an inner surface and an outer surface and a substantially continuous inner layer in intimate contact with said outer layer to define a lining substantially covering said inner surface, said outer layer having at least one aperture through which said inner layer extends to form a sealed protuberance projecting outwardly beyond the outer surface of the outer layer.

4,928,878

FASTENING RAILS TO WOODEN SLEEPERS

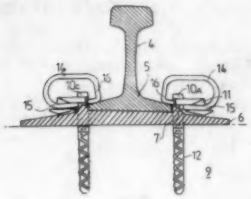
Hartley F. Young, Victoria, Australia, assignor to Ralph McKay Limited, Maidstone, Australia

Continuation of Ser. No. 822,883, Jan. 27, 1986, abandoned. This application Feb. 25, 1988, Ser. No. 163,192

Claims priority, application Australia, Feb. 1, 1985, PG9104

Int. Cl.[5] **E01B** *9/28*

U.S. Cl. 238—351 **20 Claims**



1. A support for an elastic rail clamp to be inserted into a wooden rail tie, said support including a receiving portion adapted to be above the surface of the wooden rail tie and to receive a portion of the elastic rail clamp, and a securing portion extending into the rail tie, said securing portion comprising a vertical leg portion having a longitudinal axis disposed in a plane substantially parallel to a plane established by the vertical center line of the rail, said vertical leg portion comprising a body having an outer surface, a lower end remote from said receiving portion and a side adapted to face the rail, said vertical leg portion having recesses relieved relative to said outer surface and located over at least a portion of said outer surface to accommodate an adhesive which promotes adhesion between the wooden rail tie and said securing portion, each of said recesses having an inner surface disposed in a plane substantially parallel to the plane of said outer surface, and said vertical leg portion including a series of raised ribs defined relative to said outer surface and located on the side of the lower remote end of said vertical leg portion adapted to face the rail which ribs are forced into said wooden tie when said rail clamp imparts a component force tending to move said receiving portion of said support away from the rail.

4,928,879

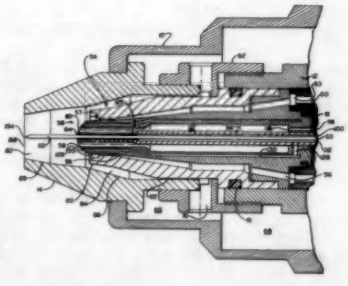
WIRE AND POWER THERMAL SPRAY GUN

Anthony J. Rotolico, Hauppauge, N.Y., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Dec. 22, 1988, Ser. No. 289,067

Int. Cl.[5] **B05B** *7/20*

U.S. Cl. 239—8 **27 Claims**



19. A method of producing a dense and tenacious coating

with a thermal spray gun including a nozzle member with a nozzle face and a gas cap extending from the nozzle member, the gas cap having an inwardly facing cylindrical wall defining a combustion chamber with an open end and an opposite end bounded by the nozzle face, the method comprising injecting an annular flow of a combustible mixture of a combustion gas and oxygen from the nozzle coaxially into the combustion chamber at a pressure of at least two atmospheres above ambient atmospheric pressure, injecting an annular outer flow of pressurized non-combustible gas adjacent to the cylindrical wall, combusting the combustible mixture, feeding heat fusible thermal spray wire axially from the nozzle into the combustion chamber to a point where a wire tip is formed where material is melted and disintegrated such that a supersonic spray stream containing the heat fusible material in finely divided form is propelled from the wire tip, feeding powder in a carrier gas coaxially from the nozzle into the combustion chamber, between the wire and the combustible mixture, and directing the spray stream toward a substrate such as to produce a coating thereon.

4,928,880

PUMPED COATING PRODUCT SPRAYING INSTALLATION

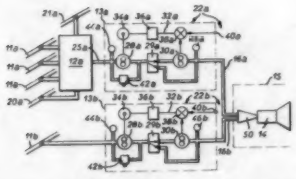
Eric Prus, Grenoble; André Frene, Vourey; Pascal Bordaz, Domene; Patrick Guerange, Tullins, and Caryl Thome, Saint Egreve, all of France, assignors to Sames S.A., Meylan, France

Filed May 9, 1988, Ser. No. 191,955

Claims priority, application France, May 19, 1987, 87 06969; Jun. 5, 1987, 87 07939

Int. Cl.[5] B05B *12/04, 12/14*

U.S. Cl. 239—8 **14 Claims**



1. Installation for spraying a coating product in liquid form, comprising at least one circuit including a pump, at least one sprayer, a flexible conduit connecting an outlet of said pump to said at least one sprayer, and servo-control means for controlling the flow rate of liquid in said conduit to a set-point by controlling said pump; and rinsing product feed means and switching means capable of controlling said rinsing product feed means to introduce rinsing product into said at least one circuit prior to completion of a coating product spray sequence to thereby cause the rinsing product to propel the coating product towards said at least one sprayer.

4,928,881

AIR FRESHENER

John J. Barlics, North Edison, and Glen D. Barlics, South Plainfield, both of N.J., assignors to Inman Mold Manufacturing Co., Inc., Rahway, N.J.

Filed Apr. 1, 1988, Ser. No. 176,792

Int. Cl.[5] A61L *9/08*

U.S. Cl. 239—44 **15 Claims**

1. An air freshener, comprising a base having an open end, an closed end, and receiving means located between said open end and said closed end for receiving a scent-producing liquid; conveying means for conveying the scent-producing liquid from said receiving means to a liquid-diffusing site located in said open end of said base such that the scent-producing liquid can be evaporatively diffused into the atmosphere surrounding said liquid-diffusing site, said conveying means including a wick-like member made from numerous strands of material capable of conveying the scent-producing liquid along said wick-like member from a first end located in said receiving means to a second end located at said liquid-diffusing site by capillary action, each of said strands extending continuously from said receiving means to said liquid-diffusing site such that the scent-producing liquid can be diffused into the surrounding atmosphere directly from said second end of said wick-like member at a relatively constant and uniform rate, said second end of said wick-like member being flared so as to promote the diffusion of the scent-producing liquid and matted so as to maintain the conveyance of the scent-producing liquid by capillary action; a wick holder attached to said base, said wick holder including first holding means for holding said first end of said wick-like member such that said strands of said first end are tightly bundled so as to promote the conveyance of the scent-producing liquid along said wick-like member by capillary action and second holding means for holding said second end of said wick-like member such that said strands of said second end substantially fill said open end of said base,

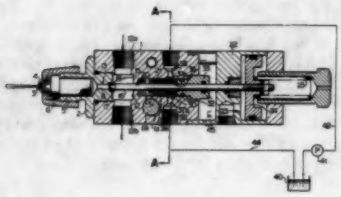
whereby the diffusion of the scent-producing liquid is enhanced as a result of the increased surface area of said second end of said wick-like member, said second holding means including a pan positioned in said open end of said base, said pan having a sidewall and a bottom which cooperate to define an interior chamber sized and shaped so as to receive said second end of said wick-like member, and said first holding means including a stem extending from said bottom of said pan to said receiving means of said base, said stem having a solid outer wall defining a conduit through which said strands of said wick-like member extend from said interior chamber of said pan to said receiving means of said base; supporting means for supporting said wick holder in abutting relationship with said base, whereby an internal joint is formed between said base and said wick holder; and sealing means for sealing said joint in a liquid-tight manner, whereby the inadvertent leakage of the scent-producing liquid from said receiving means is inhibited, said sealing means including a spring-like member having an elasticity selected such that said spring-like member is constantly and automatically urged into intimate contact with said base.

4,928,882

COATING GUN

Hikaru Awano, Owariasahi; Seiichi Asai, Seto; Katsuo Kaneko, Kashiwa; Hiroshi Kaida, Nagareyama, and Fujio Yoshida, Hiroshima, all of Japan, assignors to Cashew Company, Ltd., Saitama, Japan

Filed Mar. 20, 1989, Ser. No. 326,034
Claims priority, application Japan, Mar. 29, 1988, 63-75107
Int. Cl.[5] B05B *15/02*
U.S. Cl. 239—112 1 Claim



1. The coating gun for discharging a coating material, comprising:

a gun body having a forward end with a discharge nozzle thereon;

a coating material feed path extending through said gun body to said discharge nozzle and having an on-off valve means therein;

a guide hole extending from said feed path to the rear end of said gun body;

a valve rod slidably mounted in said guide hole and closely fitted therein and extending from said valve means to the rear end of said gun body and having a driving mechanism connected thereto at the rear end of said gun body for moving said valve rod for opening and closing said valve means;

said guide hole having a portion along the length thereof with an increased diameter for forming a cleaning chamber around the outer periphery of said valve rod; and

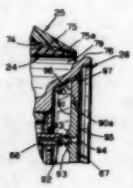
said gun body having a solvent feed port opening into said cleaning chamber and a solvent discharge port opening out of said cleaning chamber for leading solvent out of said gun body other than through said guide hole.

4,928,883

AIR TURBINE DRIVEN ROTARY ATOMIZER

Richard Weinstein, Toledo, Ohio, assignor to The DeVilbiss Company, Toledo, Ohio

Division of Ser. No. 879,082, Jun. 26, 1986, Pat. No. 4,887,768. This application Jun. 21, 1989, Ser. No. 369,306
Int. Cl.[5] B05B *5/04*
U.S. Cl. 239—223 6 Claims



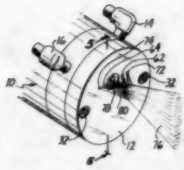
1. A rotary atomizer for coating with a coating fluid comprising, in combination, a housing, a rotary fluid atomizing device rotatably supported at one end of said housing, said device having a front surface facing away from said housing and a rear surface facing toward said housing and an annular edge from which such coating fluid is discharged by centrifugal force for atomization, said housing including an annular portion at said one end surrounding at least a portion of said atomizing device, said annular portion and said rear surface of said device forming a chamber therebetween which opens behind said annular edge, an air driven turbine located in said housing and connected for rotating said atomizer device, said turbine generating pressurized exhaust air during operation, said chamber having an annular opening formed between said annular edge of said atomizing device and said housing and vented to atmosphere, means for delivering said turbine exhaust air to said chamber for maintaining said chamber above atmospheric pressure during operation of said rotary atomizer to prevent atomized coating fluid from entering said chamber, said annular opening directing turbine exhaust air at atomized fluid discharged from said annular edge, wherein said housing includes an air cap surrounding at least a portion of said rear surface of said atomizing device, said air cap including an annular opening surrounding said annular chamber opening located for directing pattern shaping air at atomized fluid discharged from said annular edge of said device, and means for delivering pressurized air to said annular air cap opening.

4,928,884

FLUID ASSIST AIRLESS SPRAY NOZZLE

Gary L. Smith, 2896 Tabago, Costa Mesa, Calif. 92626

Continuation-in-part of Ser. No. 936,364, Dec. 1, 1986, Pat. No. 4,749,128. This application Jun. 1, 1988, Ser. No. 200,798
Int. Cl.[5] B05B *7/08*
U.S. Cl. 239—290 22 Claims



1. A nozzle system for a plural component spray gun which comprises:

a nozzle plate;

an airless discharge orifice located in said nozzle plate;

first and second fluid discharge orifices located in said nozzle plate in association with said airless discharge orifice, said first fluid discharge orifice located on one side of said airless discharge orifice and said second fluid discharge orifice located on the opposite side of said airless discharge orifice;

first and second gas discharge orifices located in said nozzle plate in association with both said airless discharge orifice and said first and second fluid discharge orifices, said first gas discharge orifice located adjacent to and outboard of said first fluid discharge orifice positioning said first fluid discharge orifice between said first gas discharge orifice and said airless discharge orifice, said second gas discharge orifice located adjacent to and outboard of said second fluid discharge orifice positioning said second fluid discharge orifice between said second gas discharge orifice and said airless discharge orifice;

means for supplying a component of a plural component system to said airless discharge orifice;

means for supplying a second component of said plural component system to said first and second fluid discharge orifices; and

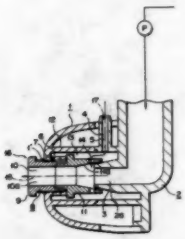
means for supplying a gas to said gas discharge orifice.

4,928,885

NOZZLE DEVICE

Haruki Nakao, Tokyo, Japan, assignor to Nikki Co., Ltd., Tokyo, Japan

Filed Mar. 31, 1989, Ser. No. 331,300
Claims priority, application Japan, Apr. 7, 1988, 63-46942
Int. Cl.[5] A61H *33/02*
U.S. Cl. 239—417 **4 Claims**



1. A nozzle device comprising:

a nozzle body provided with a nozzle opening at a front end portion thereof for jetting hot water supplied from a hot water supply source;

a nozzle casing fixed to the nozzle body so as to circumferentially enclose said front end portion, said nozzle casing having a hole arranged coaxially with said nozzle opening; a fixed sleeve projecting inwardly from said hole toward said front end portion and having a female thread; a partition wall for partitioning the fixed sleeve and the front end portion of the nozzle body; an annular chamber enclosed by said partition wall, said fixed sleeve, and said front end portion; and an air introducing sleeve for allowing the chamber to communicate with the atmosphere;

an operation sleeve having a first end protruding from said nozzle casing, a second end received in said nozzle casing; an outer surface of said operation sleeve provided with a male thread to be engaged with said female thread of said fixed sleeve, said operation sleeve being axially movable within the fixed sleeve; and

a slide sleeve having a first end connected to said second end of said operation sleeve for axial movement therewith, and a second end, at least a portion of which overlaps said front end portion of said nozzle body, said slide sleeve also formed with a radial hole communicating with said annular chamber and located adjacent to said front end portion of the nozzle body, an open area of said radial hole being controlled by said front end portion of said nozzle body when said slide sleeve is moved in an axial direction by said operation sleeve.

4,928,886

FUEL INJECTION NOZZLE

Maximilian H. Kronberger, Steyr, Austria, assignor to Voest-Alpine Automotive Gesellschaft M.B.H., Linz, Austria

Continuation of Ser. No. 151,301, Feb. 1, 1988, abandoned. This application Oct. 2, 1989, Ser. No. 415,470
Claims priority, application Austria, Feb. 4, 1987, 228/87
Int. Cl.[5] F02M *61/16*
U.S. Cl. 239—533.5 **8 Claims**

1. A fuel injection pump nozzle, comprising:

longitudinally elongated housing means having an axial bore including at an upstream end an inlet for exposure, in use, to fuel under pressure, and at a downstream end an outlet for delivering fuel to a combustion chamber of an engine;

means defining a needle valve seat in said bore of said housing means;

a valve needle longitudinally slidably received in said bore for opening and closing said outlet by sliding out of and into seating relation with said needle valve seat;

a spring means received in said axial bore and urging said valve needle axially downstream towards said seating relation with said needle valve seat;

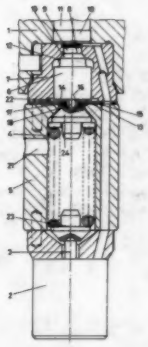
surface means on said valve needle subject to fuel pressure in said bore for longitudinally temporarily moving said valve needle for opening said bore to dispense fuel through said outlet;

means defining a yield piston seat in said bore of said housing means upstream from said needle valve seat;

a yield piston longitudinally slidably received in said bore between said valve needle and said yield piston seat for opening and closing said bore between said inlet and said needle valve seat;

a fuel bore having an inlet end communicated with said axial bore upstream of said yield piston seat and an outlet end communicated with said axial bore at said needle valve seat, whereby pressurized fuel can flow from upstream of said yield piston seat to said outlet of said axial bore of said housing means, through said fuel bore, only when said valve needle is slid out of seating relation with said needle valve seat;

surface means on said valve needle subject to fuel pressure in said fuel bore for longitudinally temporarily moving said valve needle for opening communication of said fuel bore



to said axial bore at said needle valve seat to dispense fuel through said outlet;

said yield piston including a longitudinally extending outer peripheral sidewall portion extending downstream from an annular sealing surface thereof, said sealing surface being arranged to contact said yield piston seat for closing said axial bore; said yield piston further including a piston surface axially opposed to said annular sealing surface and located downstream of said annular sealing surface; said yield piston further including an end surface facing axially towards upstream and exposed to said axial bore upstream of said yield piston seat, whereby fuel inlet pressure is communicated to said yield piston through said inlet of said axial bore;

said spring means received in said axial bore also urging said yield piston axially upstream towards said yield piston seat;

means defining a fuel drain outlet from said axial bore of said housing means between said yield piston seat and said valve needle seat;

means defining a storage space in said axial bore surrounding said yield piston and being located between said peripheral sidewall portion and said annular sealing surface of said yield piston when said yield piston is disposed in closing relation to said axial bore;

throttle plate means disposed effectively between said yield piston and said fuel drain outlet, said throttle plate means

having an opening therethrough which is more restricted in volumetric throughput capacity per unit time than is said fuel drain outlet, whereby said axial bore, between said yield piston and said throttle plate means defines an attenuation space containing said piston surface, which attenuation space, when filled with fuel modulates how rapidly said yield piston can move longitudinally in said bore in relation to said yield piston seat, whereby yielding movement of the yielding piston is reduced during engine idling; and

means defining a pathway for admitting pressurized fuel to said axial bore downstream of said yield piston seat, for filling said attenuation space;

said pathway comprising a fuel leakage pathway defined between said peripheral sidewall portion of said yield piston and said axial bore, whereby fuel admitted to said storage space when said yield piston is disposed in open relation to said axial bore may leak around said yield piston in said axial bore to downstream of said yield piston for filling said attenuation space.

4,928,887

CYLINDRICAL GUIDE DEVICE WITH OPERATING PLAY COMPENSATION FOR FUEL INJECTION SYSTEM

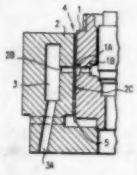
Marc Miettaux, Decines, France, assignor to Renault Vehicules Industriels, Lyon, France

Filed Dec. 2, 1988, Ser. No. 279,062

Claims priority, application France, Dec. 4, 1987, 87-16859

Int. Cl.[5] F08M *59/44, 61/16*

U.S. Cl. 239—584 **9 Claims**



1. A pressurized fluid transfer system comprising:

a nozzle having a cylindrical bore;

a needle valve slidably positioned in said bore with sufficient play for said needle valve to freely slide in said bore; and

means for transferring a pressurized fluid to said needle valve, comprising:

(a) an annular volume in said nozzle, a side of said volume facing said bore having a surface area whose value comprises a major portion of the value of the surface area of said bore,

(b) means for communicating said volume with a source of the pressurized fluid, and

(c) passage means traversing said play for communicating said volume with said needle valve whereby said pressurized fluid can fill said play;

wherein a length of said volume along the axis of said bore is selected to be sufficient that a pressure of pressurized fluid therein substantially cancels any increase in said play due to distortions of said nozzle resulting from said pressurized fluid in said play.

4,928,888

FAST SOLENOID VALVE, PARTICULARLY A FUEL INJECTION PILOT VALVE FOR DIESEL ENGINES

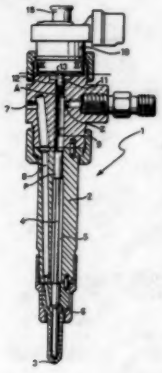
Mario Ricco, Bari, Italy, assignor to Weber S.r.l., Turin, Italy

Filed Aug. 25, 1988, Ser. No. 236,536

Claims priority, application Italy, Aug. 25, 1987, 53614/87[U]

Int. Cl.[5] F02M *41/16*

U.S. Cl. 239—533.8 **3 Claims**



1. An electromagnetically-controlled fuel injection valve for diesel engines, including:

a hollow body housing an injection chamber and a control chamber both supplied with fuel under pressure,

an injection nozzle provided at one end of said hollow body and communicating with said injection chamber,

a needle operatively associated with said nozzle to control communication between said injection chamber and said nozzle,

piston means secured to said needle and cooperating with said control chamber to keep said needle in a position closing said communication by the sole action of said fuel under pressure,

and an electromagnetic metering valve mounted at the other end of said hollow body, said metering valve comprising:

a discharge port communicating with said control chamber, the opening of which causes a drop in the pressure of said control chamber to cause said piston to move said needle to a position opening said communication,

an obturator normally closing said discharge port,

a selectively energizable cylindrical solenoid secured to said hollow body,

an armature secured to said obturator and operable by said solenoid to cause said obturator to open said discharge port,

said armature having a generally circular shape and being provided with a plurality of apertures in the form of radial notches, which open onto the peripheral of said armature to reduce the inertia and the overall magnetic inductance of said armature and hence the formation therein of parasitic electric currents.

4,928,889

WATERING SYSTEM FOR GREENHOUSE

Gary H. Lucas, Hightstown, N.J., assignor to Integrated Tech Systems, Inc., Windsor, N.J.

Filed Dec. 30, 1988, Ser. No. 292,376

Int. Cl.[5] A01G *25/09*

U.S. Cl. 239—751 **32 Claims**

1. A sprinkler watering system for a greenhouse, comprising in combination:

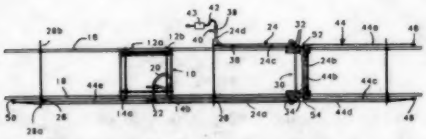
a first horizontal rail and a second horizontal rail extending

parallel to one another to define an elevated path in the greenhouse;

a carriage movably mounted to said rails;

a fluid outlet disposed at a substantially midway point along said path;

fluid transfer means for guiding fluid from said fluid outlet to said carriage, said fluid transfer means including a hose connected at one end to said fluid outlet and at an opposite end to said carriage, said hose having a first end portion extending from said fluid outlet along said first rail and a second end portion extending to said carriage along said second rail, said hose further having a middle portion connecting said first end portion to said second end portion;



first support means disposed along said first rail for supporting said first end portion of said hose;

second support means including a plurality of roller members spaced from one another along said second rail for rollably supporting said second end portion of said hose;

third support means for carrying said middle portion of said hose, said third support means including a hosecar movably mounted to said rails; and

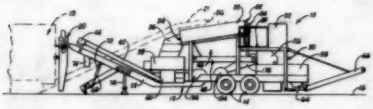
tensioning means for maintaining tension on said hose, said tensioning means including a cable operatively connected to said hosecar to exert thereon a force directed along said path and essentially directly opposed to a force exerted on said hosecar by said hose.

4,928,890

APPARATUS AND METHOD FOR PRODUCING COLD MIX ASPHALT

George W. Swisher, Jr., Oklahoma City, Okla., assignor to CMI Corporation, Oklahoma City, Okla.

Filed Jan. 14, 1985, Ser. No. 691,498
Int. Cl.[5] B02C *21/02*
U.S. Cl. 241—24 **34 Claims**



1. An apparatus for producing cold mix asphalt from liquid asphaltic composition and aggregate received by the apparatus at an uncontrolled rate, comprising:

a surge bin for receiving the aggregate;

a pugmill;

a conveyor operable to transport aggregate from the surge bin to the pugmill;

conveyor drive means for operating said conveyor at rates selectable to maintain the quantity of aggregate in the surge bin between selected high and low levels;

a pump operable to deliver asphaltic composition to the pugmill; and

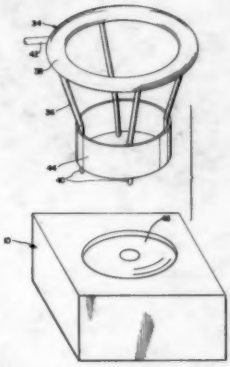
pump drive means coupling the pump to the conveyor drive means for operating the pump at a rate proportional to the rate of operation of the conveyor.

4,928,891

CRUSHING APPARATUS HAVING A FLUID SUPPLY MEANS ASSOCIATED WITH A ROTARY CRUSHER

Larie Richardson, 8835 Barrette Ave., Rosemead, Calif. 91770, and Harold Steingold, 407 16th St., Santa Monica, Calif. 90402

Filed Dec. 23, 1988, Ser. No. 289,038
Int. Cl.[5] B02C *4/00*
U.S. Cl. 247—41 **2 Claims**



1. An apparatus comprising:

a. at least one fluid supply means associated with a rotary crusher, with a crushing region located between an eccentrically rotated mantle and a stationary liner; and

b. at least one injecting apparatus for injecting air into a crushing region of said crushing apparatus, said injecting apparatus including:

(1) a port for injecting said air, said port being generally oriented in a direction of a material flow through said crushing region of said crushing apparatus; and

(2) an air manifold located adjacent to said crushing area;

(a) said air manifold being generally toroidal and located adjacent to said crushing chamber, and having a slotted opening along a region generally closest to said crushing chamber; and

(b) a single continuous air nozzle using said slotted opening, so that said manifold and said nozzle form an integrated nozzle unit having an outlet in said chamber, said integrated nozzle unit being oriented to provide an air flow generally coincident with said direction of said material flow through said chamber.

4,928,892

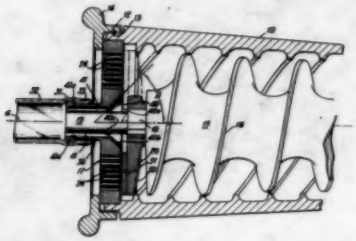
APPARATUS AND PROCESS FOR SEPARATING BONE FRAGMENTS, GRISTLE AND SINEWS FROM MEAT AS THE MEAT IS BEING GROUND

Patrick H. Huebner, Le Mars; Joseph G. Sebranek; Dennis G. Olson, both of Ames, all of Iowa, and Eugene A. Anderson, College Park, Ga., assignors to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed Oct. 14, 1988, Ser. No. 258,169
Int. Cl.[5] B02C *18/36*
U.S. Cl. 241—82.5 **13 Claims**

1. A meat grinder for comminuting meat while separating the bone fragments, gristle and sinews from the meat, the meat grinder being of the type having a tubular housing, a rotatable auger within said housing rotatable about a longitudinal axis for urging meat toward one end of said housing, a rotatable shaft connected to said auger for rotation with said auger about said axis, a chopper plate disposed at said one end of said housing and toward which said meat is urged by said auger, said chopper plate having a central portion receiving said shaft

and being provided with an inner surface and an outer surface, said chopper plate having a plurality of relatively small holes passing from one surface to the other surface through said chopper plate outwardly of said central portion, a rotatable chopper blade within said housing for riding against the inner surface of said chopper plate, said chopper blade urging the bone, gristle and sinews toward the central portion of said plate, the improvement comprising:



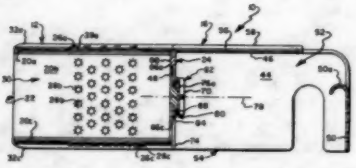
said central portion having a wall means defining a progressively tapering discharge passageway surrounding said rotatable shaft and being open except for said shaft, said discharge passageway having a relatively large throat on the inner side of said chopper plate and a smaller discharge end axially spaced and outwardly of said throat, said bone, gristle and sinews passing in generally an axial direction through said discharge end and outwardly of the outer periphery of said shaft for being discharged from said meat grinder.

4,928,893

FOOD PROCESSOR

William A. Prindle, Santa Barbara, Calif., assignor to Robinson Knife Manufacturing Co., Inc., Springville, N.Y.

Filed Apr. 10, 1989, Ser. No. 335,224
Int. Cl.[5] A47J *43/06*
U.S. Cl. 241—95 **8 Claims**



1. A food processor comprising in combination:

a hollow food shredder member having an open end, a mounting end and plural sides extending between said open end and said mounting end, said sides being provided with a food cutting element each formed with at least one aperture opening through said sides into the interior of said shredder member;

an open mouth processed food receiving container removably insertable within said shredder member through said open end for selectively positioning said open mouth thereof in alignment with a selected one of said sides to receive food processed by said cutting element thereof;

a handle member having a hollow interior and including an upper wall defining a food guide surface, opposite ends and a pair of a side walls depending from said upper wall intermediate said opposite ends and cooperating with said opposite ends to define an opening communicating with said hollow interior, said opening and said hollow interior being sized to permit said shredder member to be removably inserted into said hollow interior between said side walls with said open end and mounting end of said shredder member disposed adjacent said opposite ends;

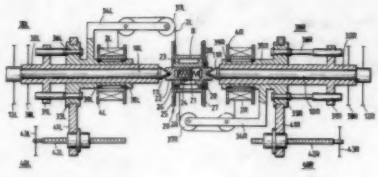
mounting means for removably joining said mounting end of said shredder member for rotation relative to one of said opposite ends of said handle member to selectively, removably position said selected ones of said sides in end-to-end alignment with said guide surface and alternatively for removably retaining said shredder member within said hollow interior of said handle member.

4,928,894

COIL WINDING MACHINE AND COIL WINDING METHOD USING THE SAME

Aritaka Ohno, Hachiouji; Kanji Shitara, Tokyo, and Masakazu Harashima, Akikawa, all of Japan, assignors to Japan Aviation Electronics Industry Limited, Tokyo, Japan

Filed Aug. 8, 1989, Ser. No. 390,787
Claims priority, application Japan, Aug. 26, 1988, 63-212717
Int. Cl.[5] H01F *11/04*; B21F *45/00*; G02B *6/00*
U.S. Cl. 242—7.09 **3 Claims**



1. A coil winding machine comprising:

first and second spindles axially aligned but spaced apart from each other, for holding therebetween a take-up bobbin;

frist and second spinner means rotatable mounted about said first and second spindles, respectively, for rotatably holding first and second supply bobbins having prestored thereon an optical fiber;

first and second driving means for rotating said first and second spinner means relative to said first and second spindles, respectively;

first and second guide means mounted on said first and second spinner means, respectively, and spaced from one another in directions transverse to the axis of said take-up bobbin, for guiding optical fiber supplied from said first and second supply bobbins onto said take-up bobbin in directions parallel to the axis of said take-up bobbin;

first and second moving means for moving said first and second spinner means axially thereof as said optical fiber is wound onto said take-up bobbin;

said first and second moving means including first and second index means rotatably mounted on said first and second spindles and fixed axially thereof for slidably holding said first and second spinner means, respectively, and first and second axial driving means engaged with said first and second spinner means axially thereof for sliding said first and second spinner means axially thereof during the rotation of said first and second index means;

said first and second driving means including first and second index driving means for driving said first and second index means independently of each other.

4,928,895

METHOD AND APPARATUS FOR ASSEMBLING A PLURALITY OF PACKAGES FOR TRANSPORT ALONG A TEXTILE MACHINE

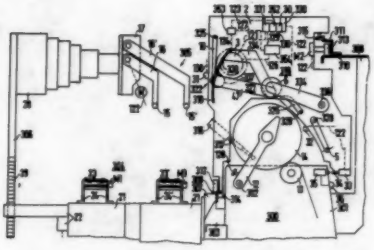
Edmund Wey, Nettetal, Fed. Rep. of Germany, assignor to W. Schlafhorst & Co., Fed. Rep. of Germany

Filed Mar. 30, 1989, Ser. No. 330,452

Claims priority, application Fed. Rep. of Germany, Mar. 30, 1988, 3810773

Int. Cl.[5] B65H *67/04, 67/06*

U.S. Cl. 242—35.5 A **13 Claims**



1. In the operation of a textile machine of the type having a plurality of winding stations for building yarn packages and a pair of independently operable package transporting devices for transporting packages from the stations to a location for further handling or processing, a method comprising:

transferring a plurality of packages from the stations to a package support means;

maintaining said package support means, and said packages supported thereon, at a clearance from said pair of package transport devices sufficient to permit said devices to transport packages therepast; and

placing said plurality of packages from said package support means selectively onto either one of said pair of package transport devices for transporting said plurality of packages by said selected packages transport device from said stations to the location for further handling or processing.

4,928,896

TRAVERSING APPARATUS FOR TRAVERSING A LONGITUDINALLY MOVING YARN WHICH IS TO BE WOUND UP THROUGHOUT A TRAVERSING STROKE

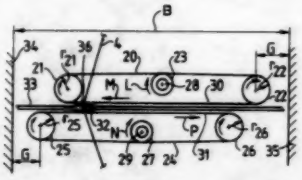
Georg Symon, Winterthur, Switzerland, assignor to Maschinenfabrik Rieter AG, Winterthur, Switzerland

Filed Dec. 22, 1988, Ser. No. 288,602

Claims priority, application Switzerland, Dec. 24, 1987, 05060/87

Int. Cl.[5] B65H *54/30*

U.S. Cl. 242—43 R **4 Claims**



1. A traversing apparatus for traversing a longitudinally moving yarn over a predetermined stroke length, comprising:

two counter-directionally moving travelling endless belts each containing two counter-directionally moving belt runs;

means for guiding the two counter-directionally moving belt runs of each of the two counter-directionally moving travelling endless belts substantially parallel to one another between stroke reversal zones of said predetermined stroke length;

said guiding means comprising for each associated counter-directionally moving travelling endless belt reversing rollers over which there is guided the associated counter-directionally moving travelling endless belt to form the two counter-directionally moving belt runs of the associated counter-directionally moving travelling endless belt;

two entrainment members defining a respective entrainment member provided for each of said two counter-directionally moving travelling endless belts for traversing the yarn in alternation in successive opposite traversing directions over an entrainment path of the predetermined stroke length along a yarn plane;

drive means for driving the two counter-directionally moving travelling endless belts;

said two counter-directionally moving travelling endless belts being provided with a yarn guide member for the yarn;

said yarn guide member being guided along the yarn plane and being movable therealong by means of one respective entrainment member of the two entrainment members of one of the two counter directionally moving travelling endless belts in one of the successive opposite traversing directions and by means of the other respective entrainment member of the two entrainment members of the other one of the two counter directionally moving travelling endless belts in an opposite one of the successive opposite traversing directions;

said predetermined stroke length including a respective stroke reversal zone at opposite end regions of said predetermined stroke length;

means defining an impact wall provided at each stroke reversal zone;

each said impact wall being disposed separately from the two entrainment members to intercept the yarn guide member; and

said yarn guide member disengaging from entrainment by an associated one of the two entrainment members in each of the stroke reversal zones and impacting against an associated one of the impact walls in free flight and changing its traversing direction and being entrainably driven in an opposite traversing direction by the other associated one of the two entrainment members only after impacting against the associated impact wall.

4,928,897

FEEDER FOR FEEDING PHOTOSENSITIVE MATERIAL

Hiroyuki Satou, and Norio Ookawa, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 18, 1989, Ser. No. 298,600

Claims priority, application Japan, Jan. 18, 1988, 63-4351[U]; Jan. 18, 1988, 63-4353[U]; Jan. 18, 1988, 63-4354[U]; Jan. 18, 1988, 63-4355[U]; Feb. 9, 1988, 63-28491

Int. Cl.[5] B65H *16/00*

U.S. Cl. 242—55 **24 Claims**

1. A feeder, incorporated into a photosensitive material processor of a printing device, for feeding a photosensitive material to the printing device, said feeder comprising:

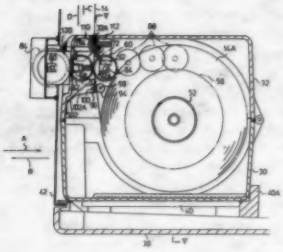
(a) a magazine body accommodating said photosensitive material therein and being formed with a take-out port for feeding out said photosensitive material;

(b) a pair of rollers, provided in said magazine body, for imparting a driving force while sezing a mid-portion of said photosensitive material;

(c) biasing means for separating one roller of said pair of rollers from the other roller of said pair of rollers; and

(d) driving force conveying means, partially exposed to the

outside of said magazine body, for selectively displacing said one roller close to said other roller by applying pressing and rotational forces from outside of said magazine body to said pair of rollers, and for feeding out said photosensitive material from said take-out port by moving said photosensitive material while seizing said material,



whereby said photosensitive material is totally stored in said magazine body before loading said magazine into said photosensitive material processor, thus preventing exposure of said photosensitive material to light to thus avoid the generation of unnecessary fogging in said photosensitive material.

4,928,898

COMPRESSION COILING MACHINE

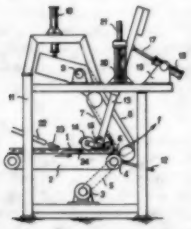
Yves Audren, and Guy Tuffal, both of Orange, France, assignors to Isover Saint-Gobain

Filed Jun. 3, 1988, Ser. No. 201,863

Claims priority, application France, Jun. 3, 1987, 87 07731

Int. Cl.[5] **B65H** *18/16*

U.S. Cl. 242—55.1 **16 Claims**



1. A process for forming rolls from strips of compressible materials, comprising the steps of:

feeding a strip of compressible material to a space defined by three rotatable members, one of said members being the first to contact said strip and another of said members comprising a compressor roller which is movable so as to progressively increase the size of said space, said members comprising means to cause said strip to coil upon itself so as to form a roll; and

driving said compressor roller during the coiling of said strip at speeds V_1 determined as a variable function of a driven speed V_2 of said one member and as a function of a length of said strip which has already been coiled, wherein $V_1 < V_2$ during at least one phase of the coiling of said strip.

4,928,899

MOBILE STORAGE UNIT FOR PROCESSING PRINTED PRODUCTS, SUCH AS NEWSPAPERS, PERIODICALS AND THE LIKE

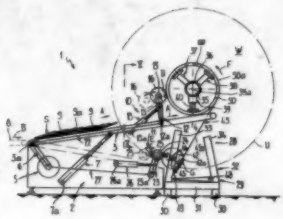
Walter Reist, Hinwil, Switzerland, assignor to Ferag AG, Hinwil, Switzerland

Division of Ser. No. 42,238, Apr. 24, 1987, Pat. No. 4,768,768. This application Jun. 6, 1988, Ser. No. 202,820

Claims priority, application Switzerland, Apr. 30, 1986, 1788/86

Int. Cl.[5] **B65B** *63/04;* **B65H** *29/16*

U.S. Cl. 242—59 **14 Claims**



1. A mobile storage unit movable to a stationary winding station and a stationary unwinding station for respectively winding up and unwinding a product package of printed products, such as newspapers, periodicals and the like conjointly with a winding band, comprising:

frame means for rotatably mounting a hollow substantially cylindrical winding core and a winding band spool for a winding band;

said frame means, in its selective location at either one of the stationary winding station or the stationary unwinding station, being positioned for connection to drive means and conveying means solely provided at said stationary winding station and said stationary unwinding station for respectively carrying out the winding-up operation and the unwinding operation;

first mounting means provided at said frame means for the removable mounting of the winding core; and

second mounting means provided at said frame means for the removable mounting of the winding band spool.

4,928,900

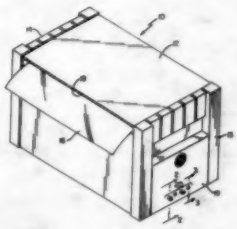
ENCODED CARTRIDGE

Jack Beery, Centerville, Ohio, assignor to The Mead Corporation, Dayton, Ohio

Filed Nov. 21, 1988, Ser. No. 274,872

Int. Cl.[5] **B65M** *19/00;* **G03B** *17/26*

U.S. Cl. 242—71.1 **1 Claim**



1. In a cartridge for containing ligh: sensitive web type medial material for application to utilization apparatus and having a molded plastic body portion in which the body por-

tion forms a cavity for containing such light sensitive material and provides light excluding integrity to said cartridge, the improvement in cartridge encoding comprising:

means on said cartridge body portion forming a plurality of binary encoding positions, wherein in each said position there is either a recess or a protrusion formed integrally with the body portion, and in which each said protrusion is hollow and is formed by an enclosing wall and a closed outer end and defining therein a hollow interior communicating directly with said body cavity such that the breaking off of a protrusion impairs the light excluding integrity of said cartridge.

4,928,901

CABLE REEL

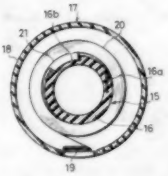
Hiroyuki Bannai; Yuichi Ida, and Hironori Kato, all of Miyagi, Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

Filed Feb. 16, 1989, Ser. No. 311,927

Claims priority, application Japan, Apr. 30, 1988, 63-57305[U]

Int. Cl.[5] B65H *75/02;* **H01R** *39/00*

U.S. Cl. 242—85 **2 Claims**



1. In a cable reel including a fixed member having an outer ring wall, a movable member having an inner ring wall and rotatably mounted to said fixed member, and a cable wound with a plurality of turns between said fixed member and said movable member and having opposite ends fixed to said outer ring wall and said inner ring wall, wherein when said movable member is rotated in either of a winding direction or an unwinding direction of said cable, said cable is wound up around said inner ring wall or is unwound to said outer ring wall; the improvement comprising:

a stopper formed of a rigid material and fixed to said cable at a position near the inner circumferential end thereof,

wherein when said cable is unwound by a predetermined amount or more, said stopper interposes as a prop between said cable unwound to said outer ring wall and said cable inverted on said inner ring wall, thereby stopping further inversion of said cable,

at least one of said stopper and said inner ring wall provided with a cutter portion for cutting said cable when a tension in the unwinding direction is applied to said cable.

4,928,902

VEHICLE SEAT BELT RETRACTOR

Yasuo Tsuji, Shiga, Japan, assignor to Takata Corporation, Tokyo, Japan

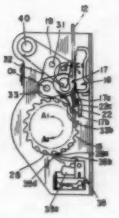
Filed Jul. 25, 1989, Ser. No. 384,981

Claims priority, application Japan, Jul. 27, 1988, 63-185522

Int. Cl.[5] B60R *22/38, 22/40, 22/42*

U.S. Cl. 242—107.2 **5 Claims**

1. A vehicle seat belt retractor having a frame, a belt reel rotatably mounted on the frame, an emergency locking mechanism for locking the belt reel to the frame against rotation in the belt-unwinding direction in response to rapid acceleration of the vehicle and including a reel-locking pawl pivotably mounted on the frame for engagement with a ratchet wheel affixed to the belt reel and an actuator plate coupled to the reel-locking pawl and movable in response to rotation of the belt reel in the belt-unwinding direction upon operation of the emergency locking mechanism to cause the reel-locking pawl to engage the ratchet wheel, and a belt-clamping mechanism including a fixed clamping member mounted on the frame and a movable clamping member carried on a lever arm mounted on the frame for pivotal movement between an inactive position in which the clamping members are spaced apart such that the belt can pass freely between them and a clamping position in which the movable clamping member clamps the belt against the fixed clamping member and prevents it from moving, and a link pivotably coupled to the lever arm and controlling the movements of the lever arm between the inactive and clamping positions, characterized in that the link is pivotably attached to the frame such as to form with the lever arm a



compound lever, in that the link includes a projection selectively engageable with the ratchet wheel, and in that the link is resiliently biassed to engage a cam follower portion thereof with a cam surface of the reel-locking pawl such that the link is pivoted in response to movement of the reel-locking pawl into engagement with the ratchet wheel by camming action of the cam surface and cam follower portion to engage the projection of the link with the ratchet wheel, whereby the rotation of the ratchet wheel in the belt-unwinding direction causes the link to pivot about its pivot mounting on the frame and to move the lever arm and movable clamping member to the clamping position.

4,928,903

PALLET FOR TRANSPORTING COPS

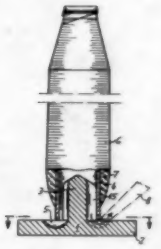
Ulrich Wirtz, and Dietmar Engelhardt, both of Mönchengladbach, Fed. Rep. of Germany, assignors to W. Schlafhorst & Co., Mönchengladbach, Fed. Rep. of Germany

Filed Sep. 29, 1989, Ser. No. 415,062

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1988, 3833259

Int. Cl.[5] B65H *49/00, 49/38*

U.S. Cl. 242—130 **5 Claims**



1. Pallet for transporting cops, comprising a disk-like base plate, a creel spindle disposed on said base plate for holding a cop having a cop tube with a tube bottom and an open interior, and a base for supporting the tube bottom, said base being interrupted at least at one point to form an air duct extending

into the open interior of the cop tube for guiding an air flow through the cop tube.

4,928,904

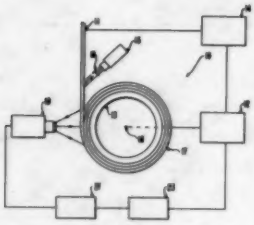
GAP, OVERWIND, AND LEAD ANGLE SENSOR FOR FIBER OPTIC BOBBINS

Robert M. Watts, Harvest, Ala., assignor to The Boeing Company, Seattle, Wash.

Filed Oct. 5, 1988, Ser. No. 253,761

Int. Cl.[5] B65H *54/28*

U.S. Cl. 242—158 R **18 Claims**



1. An apparatus for winding an optical fiber on a bobbin, comprising:

means for winding an unwound length of said optical fiber back and forth a predetermined distance along the axial length of said bobbin;

means for transmitting energy into said fiber to be internally transmitted through a selected portion of said fiber being wound;

means responsive to loss of said internally transmitted energy radially out of the longitudinal said selected portion of said fiber for detecting the position of said selected portion of said optical fiber within said predetermined distance; and

means responsive to said detecting means for controlling said winding means.

4,928,905

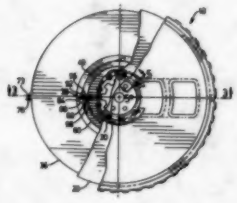
ONE-WAY CLUTCH ASSEMBLY

Robert Granzotto, and Wah K. J. Wong, both of Toronto, Canada, assignors to Arena Recreations (Toronto) Limited and William Lawrence Heisey, A Partnership Trading as Single Play Video, both of Toronto, Canada

Filed May 1, 1989, Ser. No. 345,663

Int. Cl.[5] G11B *15/32*

U.S. Cl. 242—201 **29 Claims**



29. A reel assembly for use in a tape cassette having a reel member which is mounted for rotation with respect to a stationary member which is held against rotation by the cassette, and a one-way clutch assembly for preventing rotation of the reel member in a first rotational direction with respect to the stationary member about said axis of rotation, the improvement comprising;

(a) a pawl which is mounted on one of said members for pivotal movement into and out of engagement with a shoulder formed on the other of said members to dock the members against relative rotation in one direction about said axis which permits rotation of the other direction,

(b) a slipway channel formed between said members and arranged on the perimeter of a circle which has its center aligned with said axis of rotation,

(c) pawl displacer means slidably mounted in said slipway channel for to and fro movement therealong, said pawl displacer means engaging one of said members so as to be driven into engagement with the pawl in response to said relative rotation in said first rotational direction to urge the pawl to move toward engagement with said shoulder, said pawl displacer means also being driven in response to relative rotation in the second rotational direction to urge the pawl to move out of engagement, with said shoulder to permit free rotation of the reel member with respect to the stationary member in the second rotational direction.

4,928,906

REMOTE CONTROL SYSTEM FOR A ROLLING FLYING BODY

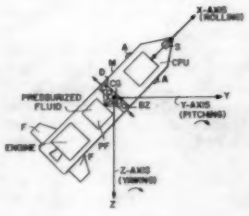
Richard Sturm, Ottobrunn, Fed. Rep. of Germany, assignor to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung, Munich, Fed. Rep. of Germany

Filed Jan. 23, 1989, Ser. No. 300,960

Claims priority, application Fed. Rep. of Germany, Jan. 22, 1988, 3801795

Int. Cl.[5] F42B *15/033*

U.S. Cl. 244—3.22 **9 Claims**

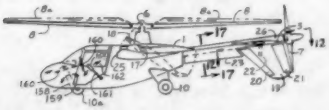


1. A remote control system for controlling pitching and yawing movements of a rolling flying body, comprising a plurality of radially arranged fluid flow control nozzles located around the circumference of said flying body, said control nozzles providing control forces for influencing movements of said flying body, a control valve operatively connected to each control nozzle for individually controlling fluid flow through the respective control nozzle, impulse signal control circuit means for providing control impulse signals to each of said control valves in such a way that at any time at least two control nozzles forming a cooperating pair of control nozzles, are activated for controlling fluid flow from a source of pressurized fluid to said nozzles for a duration determined by said control impulse signals, and means for sensing a roll angle of said flying body for supplying a respective roll angle signal to said impulse signal control circuit means so that the impulse duration of said control impulse signals is determined exclusively by a rolling frequency of said flying body.

4,928,907
COMPOUND HELICOPTER WITH NO TAIL ROTOR

Daniel R. Zuck, Sylmar, Calif., assignor to Y & B Investment Corporation, Sylmar, Calif.

Filed Feb. 29, 1988, Ser. No. 161,714
Int. Cl.[5] B64C 27/22
U.S. Cl. 244—6 9 Claims



1. In combination a compound helicopter with lifting rotor for flight comprising horizontally supported wings, left and right, on a horizontal axle means free to rotate with the direction of airflow, the said left and right wings fixedly secured to the said axle, a fuselage between the said wings to support the wings, bearing means associated with the fuselage and wing axle means for free rotation of the wings with respect to the said fuselage, the wings having counter balancing weight means to statically balance the wings about the axle axis of rotation, moveable aerodynamic control tab means on the trailing edges of the wings to vary and to control the wing angle attitude relative to the airflow direction over the wings, outboard ailerons on said wings to vary differentially the lift forces of the outer wing tips.

4,928,908
BALLOON MADE OF METAL VAPOR DEPOSITED FILM

Shigeo Horii, Kyoto, Japan, assignor to Reiko Co., Ltd., Kyoto, Japan

Continuation of Ser. No. 127,643, Dec. 2, 1987, abandoned. This application Nov. 16, 1989, Ser. No. 437,767
Claims priority, application Japan, Jun. 12, 1987, 62-147635; Jul. 29, 1987, 62-189806
Int. Cl.[5] B64B 1/58, 1/40
U.S. Cl. 244—31 8 Claims

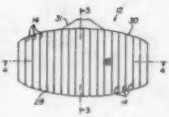
1. A balloon formed by heat-sealing at least one heat-sealable sheet which comprises a plastic film and a metal vapor deposition layer formed on one side of the plastic film, characterized in that the metal vapor deposition layer is composed of Sn and discontinuously formed so that the sheet has a metallic appearance but has a dielectric breakdown voltage of at least 1000 V.

4,928,909
ELLIPTICAL RAM AIR PRESSURIZED AIRFOIL PARACHUTE

John G. Bouchard, P.O. Box 688, North Conway, N.H. 03860

Filed Jun. 18, 1987, Ser. No. 64,178
Int. Cl.[5] B64D 17/02
U.S. Cl. 244—145 6 Claims

1. A ram air parachute comprising in combination:
an upper surface, having a truncated elliptical plan configuration;
a lower surface having a configuration similar to said upper surface;
a plurality of ribs connecting said upper and lower surfaces together, said ribs having a plurality of openings therein;
a leading edge defining a relatively large opening for admitting ram air into said ram air parachute;
a trailing edge configured so as to minimize the flow of air through said ram air parachute;
a plurality of chambers defined by said upper and lower surfaces, said ribs, said leading edge, and said trailing edge, said plurality of chambers communicating through said plurality of openings in said ribs so as to maintain equal air pressure in all of said chambers;
two stabilizer surfaces depending downward on opposite sides of said ram air parachute, said stabilizer surfaces being attached to said upper and lower surfaces; and
means for controllably attaching said ram air parachute to a parachutist;

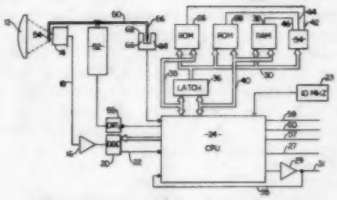


wherein the truncated elliptical plan configuration provides an aspect ratio approaching 3.23 and thereby results in a glide ratio of about 4.0 for a ram air parachute.

4,928,910
DETECTION OF OVERHEATED RAILROAD WHEEL AND AXLE COMPONENTS

Jeffery J. Utterback, Harrisonville, and Randall S. Mecca, Warrensburg, both of Mo., assignors to Harmon Industries, Inc., Blue Springs, Mo.

Filed Oct. 11, 1988, Ser. No. 255,787
Int. Cl.[5] B61K 9/06
U.S. Cl. 246—169 A 18 Claims



8. In apparatus for detecting an overheated component of a railroad train:
a sensing unit adapted to be disposed at trackside and having an infrared sensing element and means for focusing incident infrared radiation from a passing component on said sensing element,
a shutter movable between a normally open position and a closed position in which the shutter blocks radiation that would otherwise reach said sensing element via said focusing means so that the sensing element is subjected only to ambient heat,
means responsive to said sensing element for producing a heat signal during a period in which the sensing element is scanning the passing component,
drive means connected to said shutter for repeatedly momentarily closing the same at successive time spacings each shorter in duration than said period, and
output means responsive to said heat signal for comparing its amplitude between said time spacings with its amplitude at said time spacings.

4,928,911

SUPPORTING BRACKET FOR PIPES

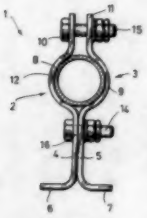
Hans H. Hardtke, Zeven, Fed. Rep. of Germany, assignor to Lisega GmbH, Fed. Rep. of Germany

Filed May 15, 1989, Ser. No. 351,636

Claims priority, application Fed. Rep. of Germany, May 20, 1988, 8806646[U]

Int. Cl.[5] F16L *3/08*

U.S. Cl. 248—74.1 **15 Claims**



1. A pipe support bracket comprising a pair of clip elements, each clip element including a foot disposed generally transverse to a lower bar portion which is in turn joined to an upper bar portion by an intervening semicircular pipe gripping portion, said clip elements being positioned with said semicircular pipe gripping portions opening in opposed relationship to each other whereby a pipe can be housed therebetween, said feet projecting in opposite directions away from each other, said lower bar portions being disposed generally intimately adjacent each other and contiguous a plane passing through a center defining the generatrix of said semicircular pipe gripping portions, said upper bar portions being disposed in spaced relationship from each other and from said plane passing through said center, the spacing between said upper bar portions being greater than that between said lower bar portions, a first opening in each of said upper bar portions, said first openings being generally aligned, a pair of second openings in each of said lower bar portions, said second openings of said lower bar portions being generally aligned, said second openings of each pair of openings of said lower bar portions being located on opposite sides of a second plane normal to said first-mentioned plane and passing through centers of said first openings, and means for securing said upper and lower bar portions to each other through said associated openings.

4,928,912

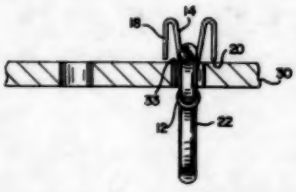
PEGBOARD HANGER ANCHOR

Bronislaw B. Florek, Chicago, Ill., assignor to ABC Consulting Services, Inc., Oak Brook Terrace, Ill.

Filed Aug. 24, 1989, Ser. No. 397,905

Int. Cl.[5] E04G *3/00*

U.S. Cl. 248—221.2 **10 Claims**



1. An anchor to stabilize a hanger in a pegboard, the pegboard having a plurality of perforations and front and rear surfaces, the hanger having a vertically elongated shank with a forwardly extending hook to support articles thereon, said anchor comprising:

means for attaching said anchor to said elongated shank;

a pair of legs extending rearwardly from opposing ends of said attaching means, and adapted for insertion through one of the perforations; and,

a pair of feet having terminal ends extending forwardly from each of said legs and directed substantially toward said attaching means, said feet further adapted to abut the rear surface of the pegboard at said terminal ends.

4,928,913

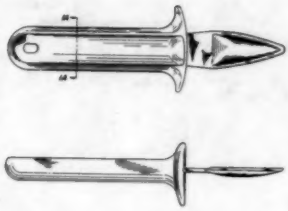
WALL MOUNTING SYSTEM

Thomas C. Laughon; Roy Y. Nicholson; Michael E. Barrett, all of Hickory, and Robert C. Beckmann, Vale, all of N.C., assignors to McCalla/Lackey Products Corporation, Hickory, N.C.

Filed Mar. 10, 1989, Ser. No. 321,378

Int. Cl.[5] A47B *67/02*

U.S. Cl. 248—224.1 **10 Claims**



1. A wall mounting system comprising:

a horizontally mounted rail attached to a wall structure said rail having a top surface which is undercut to form an acute angle at the juncture with said wall structure, said undercut forming on the top surface with juncture of said wall structure a suspending cleat,

said horizontally mounted rail including a first horizontal flange with a first vertical flange extending upwardly from one end thereof, a flange extending downwardly at an acute angle from the top end of the first vertical flange in the direction of the other end of the first horizontal flange and spaced therefrom, a second horizontal flange extending at one end from the bottom end of the angled flange toward the one end of the first horizontal flange and spaced therebelow, and a second vertical flange extending downwardly from the other end of the second horizontal flange and being coplanar with the first vertical flange, with the cleat being formed by the angled flange and a locking area located between the first and second horizontal flanges. said suspending cleat to support said suspended structure from said rail.

4,928,914

TILTABLE MOUNTING BRACKET

W. S. Snodell, Glen Ellyn, Ill., assignor to Peerless Industries, Inc., Melrose Park, Ill.

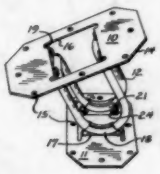
Filed Feb. 21, 1989, Ser. No. 312,202

Int. Cl.[5] E04G *3/00*

U.S. Cl. 248—274 **18 Claims**

1. A tiltable mounting bracket for adjustably securing an appliance to a surface, said bracket comprising a first plate adapted for securing said bracket to said surface, a second plated adapted for attachment of said appliance on to said bracket, and a U-shaped member having a tubular cross-section connected to and arranged for selected movable securement between said plates, said plates and said U-shaped member

having cooperative arcuate means for adjustably tilting one plate relative to the other plate both in vertical and horizontal



direction and wherein one plate may be disposed angularly to the other plate.

4,928,915

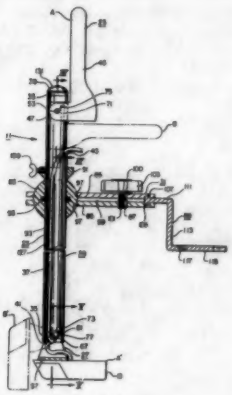
MOUNTING APPARATUS FOR SONAR TRANSDUCER

Felton H. Havins, 300 N. E. 6th St., Fort Worth, Tex. 76106

Filed Feb. 24, 1989, Ser. No. 314,903

Int. Cl.[5] E04G *3/00*; H04R *1/44*

U.S. Cl. 248—288.5 **23 Claims**



1. An apparatus for mounting a sonar transducer to a boat, comprising:

(a) a first member having first and second end portions;

(b) handle means pivotally coupled to said first member first end portion;

(c) transducer mounting means being adapted for coupling to said sonar transducer, said transducer mounting means being pivotally coupled to said first member second end portion such that said transducer mounting means can change elevational orientation with respect to a water line of said boat;

(d) a second member located adjacent to said first member, said second member coupled to said handle means and to aid transducer mounting means so as to link said transducer mounting means to said handle means, wherein when said handle means is pivoted the elevational orientation of said transducer mounting means correspondingly changes;

(e) first member mounting means for mounting said first member to said boat said first member mounting means having an opening for receiving said first member, said first member being able to slide in said opening relative to said first member mounting means, said first member mounting means allowing said first member, said handle means, and said transducer mounting means to turn wherein the azimuthal orientation of said transducer mounting means changes;

(f) retaining means for retaining said first member in a selected position relative to said first member mounting means.

4,928,916

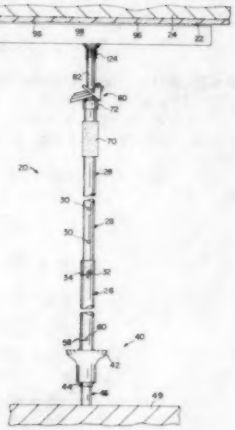
CEILING PANEL INSTALLATION SUPPORT WITH TELESCOPING PANEL REST FOR EASE OF CARRYING

John F. Molloy, P.O. Box 3482, Stamford, Conn. 06905

Filed Apr. 28, 1989, Ser. No. 344,693

Int. Cl.[5] E04G *25/00*

U.S. Cl. 248—354.1 **7 Claims**



1. In a temporary support device for use in installing overhead construction material for aiding the installer in positioning and attaching such construction material to overhead structure, wherein said temporary support device includes a horizontally extending member upon which construction material can be supported temporarily, an elongated support rod adapted for being positioned generally vertically and having upper and lower ends, means connecting said horizontally extending member in generally perpendicular relationship to said upper end of said elongated support rod for permitting said elongated support rod to be tilted somewhat away from vertical while said horizontally extending member remains horizontal, a tubular support column having top and bottom ends, said lower end of said elongated support rod being received in said top end of said tubular support column in telescoping relationship therein for permitting said elongated support rod to be moved upwardly and downwardly relative to said tubular support column, a manually releasable one-way friction clutch assembly operably associated with said tubular support column and frictionally engageable with said elongated support rod for allowing said elongated support rod to be moved freely upwardly for extending said elongated support rod upwardly relative to said tubular support comumn while normally frictionally gripping said elongated support rod for preventing said elongated support rod from moving downwardly relative to said tubular support column, a vertically elongated, floor-engaging member adapted to rest upon a floor, said vertically elongated, floor-engaging member being in telescoping relationship with said bottom end of said tubular support column for permitting said bottom end of said tubular support column to be moved upwardly and downwardly relative to said floor-engaging member, a compression spring having first and second ends, said first end of said compression spring exerting a downward force on said floor-engaging member and said second end of said compression spring exerting an

upward force on said tubular support column, the improvement comprising:

said vertically elongated floor-engaging member being tubular and having an interior and having said compression spring positioned entirely within said interior,

said vertically elongated floor-engaging member having vertically extending guide slots therein,

a transversely extending pin secured to said tubular support column and extending through said guide slots and transversely through the interior of said vertically elongated floor-engaging member,

spring stop means within said interior held by said pin, and

said second end of said spring thrusting upwardly against said spring stop means.

4,928,917

HOLDING FIXTURE, IN PARTICULAR FOR MEDICAL USE

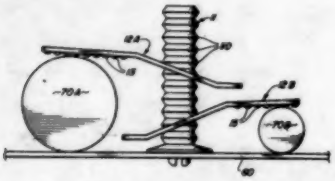
Hans-Joachim Wolf, Theodor-Schweitzer-Str. 1, D-7137, Sternenfels-1, Fed. Rep. of Germany

Filed Mar. 25, 1988, Ser. No. 173,475

Claims priority, application Fed. Rep. of Germany, Mar. 26, 1987, 3710016

Int. Cl.[5] B65D *45/00*

U.S. Cl. 248—507 **12 Claims**



1. A holding fixture mountable in an insertion opening provided in a support panel which has a plurality of insertion openings for receiving a plurality of such holding fixtures, and fixture serving for supporting and securing an article and said fixture comprising: a retaining member having an outer surface which has an at least partially ribbed profile; and a resiliently deformable bracket member detachably engageable with said retaining member and having an aperture dimensioned to permit passage of said retaining member therethrough, when said bracket member has a first selected orientation relative to said retaining member, and to establish locking engagement directly between said bracket member, in the region of the edge of said aperture, and said retaining member, accompanied by elastic deformation of said bracket member, when said bracket member has a second selected orientation relative to said retaining member.

4,928,918

PRINTER AND STAND ASSEMBLY

William A. Bowes, Kettering, Ohio, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 12, 1989, Ser. No. 350,864

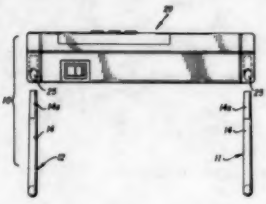
Int. Cl.[5] E21F *17/02*

U.S. Cl. 248—688 **5 Claims**

1. An improved printer/stand assembly comprising:

(a) a printer having a bottom wall with two pairs of spaced, opposing leg recesses formed therein; and

(b) two U-shaped members comprised of substantially linear opposing leg portions and substantially linear interconnector portion, each of said leg portions having ends that are sized to loosely fit into said leg recesses, the interconnector portion of each of said members being deflectable and the span between said leg portion ends being sufficiently less than the spacing between the centers of opposing leg recesses that when said leg portions are spread and fit into said leg recesses, the U-shape members are retained by member restoring forces and the deflection of their interconnector portions form into a concave-down configura-



tion for providing support surface, point-type contact regions proximate each leg-interconnector portions juncture.

4,928,919

STOP VALVE

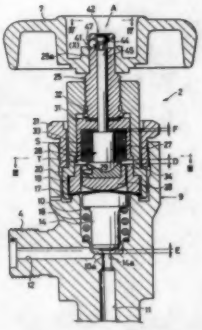
Norio Daicho; Masakatsu Kawahara; Jiro Nitta; Koji Miyazaki, and Keitaro Yonezawa, all of Hyogoken, Japan, assignors to Kabushiki Kaisha Neriki, Hyogoken, Japan

Filed Oct. 18, 1989, Ser. No. 423,284

Claims priority, application Japan, Oct. 21, 1988, 1-266814; Apr. 5, 1989, 64-87647

Int. Cl.[5] F16K *31/50, 35/00*

U.S. Cl. 251—89 **9 Claims**



1. A stop valve, including a handle used for valve opening and closing manipulations and adapted to be detached after completion of a valve closing manipulation, comprising:

a valve box, provided with a valve chamber having a valve seat;

a movable valve body provided with a sealing surface selectively movable to a valve opening position and to a valve closing position with respect to said valve seat within the valve chamber;

a thrust threaded member provided with an input portion, threadably engaged with the valve box so as to be adjustably advanced and returned with respect thereto;

a handle, adapted to be rotatably interlockingly connected to said input portion and to be attached and detached in the axial direction with respect thereto wherein, when said handle is turned in a valve closing direction the thrust threaded member is advanced with respect to the valve box and said valve body is moved toward the valve closing side by a thrust imparted by the thrust threaded member so that the sealing surface thereof is brought into contact with the valve seat to attain a valve closing;

a valve closing thrust transmission mechanism comprising at least coned disc spring surrounding an intermediate transmission member arranged in order from the thrust threaded member to the valve body, so that the intermediate transmission member is urged in the valve closing direction by said at least one coned disc spring under its condition capable of being advanced and returned within a first predetermined distance in the valve opening and closing directions of the valve body with respect to the thrust threaded member;

means for restraining a stopper for the handle, formed cooperatively by the thrust threaded member and the intermediate transmission member,

said restraining means being so constructed as to be changed over between a handle-holding condition wherein the stopper is restrained in an engagement position with respect to the handle and a handle-releasing condition wherein its restraint against the stopper is released, whereby when the intermediate transmission member has been advanced toward the valve closing side by means of the at least one coned disc spring with respect to the thrust threaded member the restraining means is brought into the handle-holding condition, and when the thrust threaded member has been advanced toward the valve closing side against the at least one coned disc spring with respect to the intermediate transmission member the restraining means is brought into the handle-releasing condition;

a contact receiving means, provided in at least one of the intermediate transmission member and the fixing side portion of the valve box so as to limit the advancing movement of the thrust threaded member toward the valve closing side to a second predetermined distance with a contact receiving position of said contact receiving means being set at a midway position of the compression range of the at least one coned disc spring to thereby ensure that said at least one, coned disc spring is not subjected to complete compression so that said valve body sealing surface is not subjected to an abnormally large sealing contact force.

4,928,920

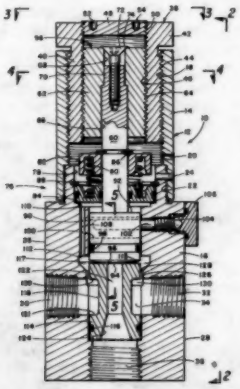
FINELY-ADJUSTABLE FLOW CONTROL VALVE

Eugene P. Feild, Ft. Wayne, Ind., assignor to Laminar Fluid Controls, Inc., Fort Wayne, Ind.

Filed May 18, 1989, Ser. No. 353,596

Int. Cl.[5] F16K *31/50, 47/08, 1/04*

U.S. Cl. 251—118 **9 Claims**



1. Apparatus for adjusting flow through a valve body of the type having a valve member mounted on one end of a valve stem which is axially movable relative to the valve body for positioning the valve member relative to a valve seat, said apparatus comprising:

an annular member;

a pair of coaxial threaded connections, the first being formed between the valve body and said annular member and the second being formed between said annular member and the valve stem, said first threaded connection having a different number of threads per unit of axial length than said second threaded connection;

means for constraining rotational movement of the valve stem relative to the valve body;

a first side of said valve member directed toward said valve seat;

a second side of said valve member opposite said first side; and

means for equalizing pressure between said first and second sides of said valve member.

4,928,921

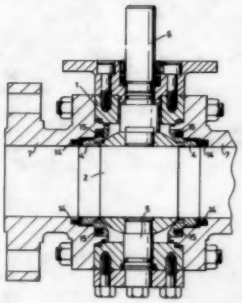
BALL VALVES FOR PIPELINES

John Steele, Fife, United Kingdom, assignor to T K Valve Limited, United Kingdom

Filed Oct. 10, 1989, Ser. No. 419,615

Int. Cl.[5] F16K *5/22*

U.S. Cl. 251—175 **3 Claims**



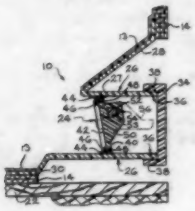
1. A ball valve comprising a valve housing, a valve ball in the housing turnable between open and closed position, pipe connectors or so-called adaptors connected to opposite ends of the housing and valve seats located in recesses in said adaptors and/or housing and resiliently into sealing engagement with the ball, wherein each valve seat has an annular face confronting the ball, the face being a surface of revolution about the axis of the seat of a line inclined to the said axis, the face being interrupted by an annular groove so as to leave a radially inner annular rib having a radially inner part of the said face, the said face being so arranged relative to the ball that at low pressures there is line contact of the ball with the seat nearer the radially outer edge of the radially inner part of the said face, and at high pressures where the ball undergoes elastic deformation from a true sphere towards an oblate spheroid there is an accompanying elastic radially outward flexing of the radially inner annular rib so that the line contact of the ball with the seat moves nearer the radially inner edge of the radially inner part of the said face, and the radially outer part of the said face is clear of the ball in normal operations but is available to come into contact with ball in the event of failure of the ball valve.

4,928,922

BUTTERFLY DISCHARGE VALVE ASSEMBLY FOR A LIQUID BULK CONTAINER

Dwight E. Nichols, Beatrice, Nebr., assignor to Hoover Group, Inc., Alpharetta, Ga.

Filed Nov. 13, 1989, Ser. No. 435,690
Int. Cl.[5] F16K *1/22*
U.S. Cl. 251—180 **11 Claims**



1. In a liquid bulk container, a butterfly discharge valve assembly comprising:

a body member having a discharge passage in fluid communication with said container and having an inner wall of generally circular cross-section, said discharge passage being operable to allow liquid from a liquid bulk container to be discharged therethrough;

a valve member of substantially disc shape disposed within said discharge passage, said valve member having opposite side faces and being of a diameter slightly larger than the diameter of said inner wall of said discharge passage, said valve member being moveable in said passage between open and closed positions, said valve member having a sealing edge surface and a groove in one of said faces at a position in close proximity to said edge surface; and

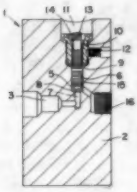
compressible, resilient material substantially filling said groove for enabling said edge surface to be deflected inwardly toward said groove by said inner wall when said valve member is moved into said closed position, said groove and said sealing edge surface coacting to effect a leak-proof seal between said edge surface and said inner wall when said valve element is moved into said closed position.

4,928,923

FLANGED VALVE

Gunter M. Lassally, Amsterdam, Netherlands, assignor to Amstelstaal B.V., Amsterdam, Netherlands

Filed Feb. 21, 1985, Ser. No. 704,304
Claims priority, application Netherlands, Feb. 28, 1984, 8400607
Int. Cl.[5] F16K *31/44*
U.S. Cl. 251—221 **8 Claims**



1. A flanged valve comprising:

a valve box having a substantially axially extending channel formed therein, said channel at one side being adapted to be connected to a supply line and at the other side to a discharge line, the valve box substantially forming a cylindrical flange that has one side adapted to be connected to an end of a line comprising a flange and the other side being adapted to be connected to an end of a line comprising a thread,

a valve means and associated operating mechanism positioned entirely within the valve box to shut-off the channel entirely or partially,

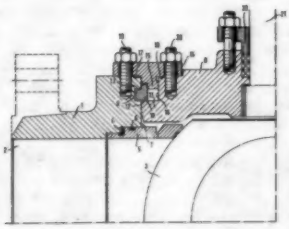
means for mounting the valve box between the supply line and the discharge line, said mounting means including passing through bores through which mounting bolts can extend.

4,928,924

VALVE

Pekka J. Kivipelto, Helsinki, Finland, assignor to Neles Oy, Helsinki, Finland

Continuation of Ser. No. 258,589, Oct. 17, 1988, abandoned. This application Oct. 27, 1989, Ser. No. 428,003
Claims priority, application Finland, Oct. 21, 1987, 874642
Int. Cl.[5] F16K *5/06*
U.S. Cl. 251—315 **4 Claims**



1. A valve comprising a housing having a through flow duct; an opening in said housing, sealing means in said duct and a closing member disposed in said housing in engagement with said sealing means so as to be rotatable between a position where flow through said housing is permitted and a closed position where flow is prevented, said closing member being of a size to permit insertion thereof through said opening in said housing; said closing member including a shaft engaged therewith for rotating said closing member, said shaft extending through said opening in said housing;

a first cover means for said opening in said housing and including a passage for said shaft of said closing member, said passage having seal means for sealingly engaging said shaft, a locking member for locking said first cover means with respect to said opening in said housing, said locking member including a stop face facing toward the interior of said opening in said housing, a second cover means detachably secured by first attachment means directly to said housing and be second attachment means directly to said first cover means, said second cover means including seal means between said second cover means and said housing and between said first cover means and said second cover means.

4,928,925

CONSTANT TENSION HOISTING MEMBER

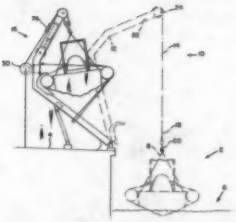
S. Grant Christison, 723 Sudden Valley, Bellingham, Wash. 98226

Continuation of Ser. No. 653,942, Sep. 20, 1984, Pat. No. 4,624,450. This application Apr. 2, 1986, Ser. No. 847,496
Int. Cl.[5] B66D *1/52, 1/08*
U.S. Cl. 254—272 **8 Claims**

1. A constant tension hoisting system having a single-lever control for a winch having a drive torque variable from minimum to maximum in a constant tension mode and that is opera-

ble to be switched between a normal mode and a constant tension mode for raising and lowering an object supported by a cable on the winch between a relatively stable platform and a surface undergoing vertical wave motion relative to the platform, said lever control being capable of switching the system between the normal and the constant tension mode, comprising:

a single, manually actuated control lever means positionable for controlling the winch for (1) hoisting and lowering in the normal mode, (2) varying the cable tension of the constant tension mode, and (3) activating a constant tension mode selection circuit to allow switching between the normal mode and the constant tension mode;



said control lever being positionable into a commit-to-constant-tension position when activating the constant tension mode selection circuit;

means responsive to the control lever being placed in the commit-to-constant-tension position for activating the constant tension mode selection circuit to allow switching between the normal mode and the constant tension mode; and

means responsive to a change to minimum cable tension for automatically switching the winch from the normal mode to the constant tension mode when the constant tension mode selection circuit is activated.

4,928,926

FLUID PRESSURE OPERATED PUSH BEAM AND APPARATUS COMPRISING ONE OR MORE OF SUCH PUSH BEAMS

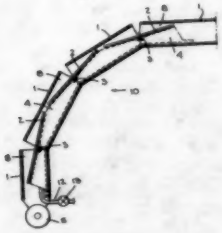
Berend J. Bloemendal, Emmen, and Marinus J. G. Bromhaar, Hengelo, both of Netherlands, assignors to Persluchtring Advies B.V., Emmen, Netherlands

Filed Feb. 10, 1988, Ser. No. 154,551

Claims priority, application Netherlands, Feb. 10, 1987, 8700307

Int. Cl.[5] B66F *3/24*

U.S. Cl. 254—93 R **13 Claims**



1. A fluid pressure operated push beam, comprising a plurality of similar rigid open-ended tubular sections; a plurality of hinge pins articulating said tubular sections to each other in head-to-tail relationship perpendicular to a longitudinal median plane of the push beam; a number of plates corresponding to the number of hinge pins, each connected to a respective one of the hinge pins for pivotal movement about the axis thereof, the portions of each plate which are situated on either side of the associated hinge pins being disposed in the respective tubular section which is located on the corresponding side of that hinge pin and having a width smaller than the width of said respective tubular section; and inflatable inner arc hose means having a length less than that of the series of tubular sections but larger than the distance between the outermost ones of said hinge pins, said inner arc hose means being disposed within the series of tubular sections in longitudinal direction in the space defined on the same side of said hinge pins and said plates connected thereto, and said inner arc hose means further having closable supply means for directing into said inner arc hose means a pressure fluid operative for inflating said inner arc hose means.

4,928,927

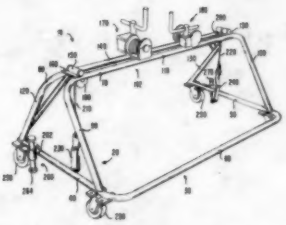
LIFTING MECHANISM FOR HEAVY STREET GRATINGS

William R. Fredrick, 909 Lagoon La., and Robert H. Stuhler, 1024 Barnegat La., both of Mantoloking, N.J. 08738

Filed Dec. 21, 1987, Ser. No. 135,599

Int. Cl.[5] B66D *1/26*; B66C *23/00*

U.S. Cl. 254—279 **7 Claims**



1. A lifting mechanism for heavy covers of catch basins, street manholes, and the like, comprising:

a rigid frame;

wheels on said frame for moving said frame about on a surface;

winch means including at least two drums mounted on said frame, each drum having an irreversible worm drive, said worm drives being independent of each other;

cable means coupled to and operated by said winch means;

coupling means connected to said cable means and adapted to be coupled to a heavy cover to be lifted and moved about; and

surface-engaging means on said frame for securing a portion of said frame in place so that said frame can be pivoted on its wheel about said surface-engaging means as a pivot point.

4,928,928

GUARDRAIL EXTRUDER TERMINAL

C. Eugene Buth; Asif Qureshy, both of College Station; Hayes E. Ross, Jr., Bryan, and Dean L. Sicking, College Station, all of Tex., assignors to The Texas A&M University System, College Station, Tex.

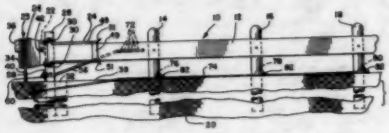
Filed Jan. 12, 1988, Ser. No. 143,367

Int. Cl.[5] E01F *15/00*

U.S. Cl. 256—13.1 **8 Claims**

1. A highway guardrail system comprising a horizontally extending W-beam type guardrail mounted on a plurality of posts, and an extruder terminal connected to an end of said guardrail for engaging an impacting vehicle at the end of said guardrail, said terminal including a housing having an inlet for

receiving the end of said guardrail, a squeezing extruder throat within said housing for telescoping over said guard rail and flattening the guardrail as said terminal is advanced longitudinally along the guardrail by an impacting vehicle, thereby dissipating energy to decelerate the impacting vehicle, and



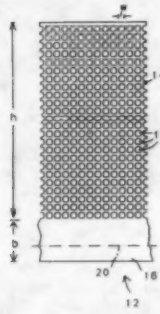
bending means extending laterally from said squeezing extruder throat for bending the flattened guardrail laterally away from the longitudinal axis of said guardrail so as to remote the flattened guardrail from the path of an impacting vehicle advancing said terminal along the guardrail.

4,928,929

CONSTRUCTION SAFETY NETTING

Jay Kinder, 37 - 10 Lenox Dr., P.O. Box 2635, Fair Lawn, N.J. 07410

Filed Feb. 5, 1988, Ser. No. 152,626
Int. Cl.[5] E04H *17/16*
U.S. Cl. 256—24 **27 Claims**



7. Construction safety netting comprising a flexible web in turn comprising:

a main portion provided with an array of apertures to form a lattice; and

a secondary portion including a substantially continuous toeboard strip integral with said main portion, said secondary portion further including means for attaching the netting to a substantially horizontal surface along said toeboard strip, at an edge thereof opposite said main portion, so that said toeboard portion is substantially contiguous with the horizontal surface to prevent small objects from passing along the horizontal surface beyond the safety netting.

4,928,930

BALUSTRADE

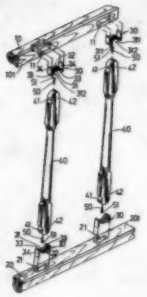
Yu-Kuei Chung, No. 15, Yung-An St., Feng-Yu City, Taiwan

Filed Nov. 2, 1989, Ser. No. 430,561
Int. Cl.[5] E04H *17/14*
U.S. Cl. 256—67 **3 Claims**

1. A balustrade comprising:

a top and bottom rail each of which has a face having a plurality of aligned grooves formed along a length thereof;

a plurality of plug members each of which includes a U-shaped portion having two arms and an open side, and two flap portions extending respectively from said two arms of said U-shaped portion in an opposite direction relative to said open side of said U-shaped portion, each of said plug members being fixed in said grooves of said rails with said open side of said U-shaped portion thereof facing said faces of said rails, each of said U-shaped portions of said plug members having a guiding slot with two enlarged ends formed therein; and



a plurality of balusters of equal length parallelly mounted between said top and bottom rails, each of said balusters having two end portions respectively and rotatably received in one of said U-shaped portions of said plug members on said top rail and one of said U-shaped portions of said plug members on said bottom rail, each of said end portions of said balusters having a retaining member fixed thereto which is slidably retained in said guiding slots to prevent said end portions of said balusters from separating from said plug members of said rails, so that an angle between said top rail and each of said balusters can be adjusted by means of parallelly moving said top rail relative to said bottom rail.

4,928,931

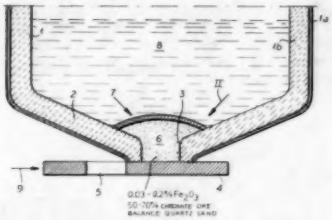
METHOD FOR CONTROLLING DISCHARGE OF STEEL FROM A CASTING LADLE

Heinz Dislich, Am Botanischen Garten, 8, 4100 Duisburg, and Horst Richter, Duisburg, both of Fed. Rep. of Germany, assignors to Heinz Dislich, Duisburg and Krupp Stahl, Bochum, both of, Fed. Rep. of Germany

Division of Ser. No. 735,957, May 20, 1985, abandoned. This application Sep. 20, 1988, Ser. No. 247,112
Claims priority, application Fed. Rep. of Germany, May 24, 1984, 3419306
Int. Cl.[5] C21B *7/12*
U.S. Cl. 266—45 **6 Claims**

1. A method for controlling the discharge of a steel melt from a casting ladle comprising filling the pouring spout of said ladle with a particulate filling mass consisting essentially of 50 to 70% by weight of chromium ore sand, 0.03 to 0.2% by weight iron oxide and the balance quartz sand intimately mixed together, forming a cap at an interface of said mass and said

melt to support said melt in said spout, moving a slider to cover a mouth of said spout into an open position for discharging said



melt, and rupturing said cap by discharge of said mass from below said melt.

4,928,932

BAND CASTING-SETTING-BURN-CUTTING MACHINE IN A LINE-LIKE LAYOUT

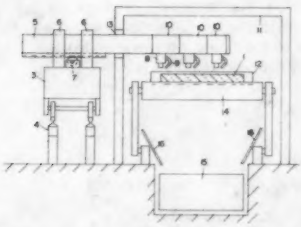
Horst K. Lotz, Königstein-Johanniswald, and Günther Thomma, Wiesbaden-Delkenheim, both of Fed. Rep. of Germany, assignors to Aute Gesellschaft fuer autogene Technik mbH, Switzerland

Filed Jul. 1, 1988, Ser. No. 214,215

Claims priority, application Fed. Rep. of Germany, Jan. 7, 1987, 3721685

Int. Cl.[5] B23K *7/02*

U.S. Cl. 266—58 **20 Claims**



1. A burn cutting apparatus for separating a piece from a sheet metal band having a pair of lateral edges, said burn cutting apparatus comprising:

a conveyor line for transporting said metal band;

a burn cutting machine moveably mounted to a pair of rails, said machine moveable by a motor along said pair of rails in a direction parallel to said conveyor line, said burner cutting machine having at least one burner arm moveable in a direction normal to the direction of movement of said metal band on said conveyor line, each said burner arm having a least one burner for cutting said metal band to separate said piece therefrom; and

means for moving said burn cutting machine along said rails at a speed equal to the speed of said band moving along said conveyor, said means for moving comprising a first roller having an impulse generator, said roller mounted transversely across said conveyor line upstream of said burn cutting machine, said roller contacting said band, said impulse generator producing a predetermined number of impulses in response to a speed of movement of said roller, means for controlling the speed of said motor of said burn cutting machine in response to said predetermined number of impulses, said means for controlling measuring said number of impulses per unit of time to produce an electrical analog to control said motor to produce a rate of travel of said burn cutting machine equal to the speed of travel of said band.

4,928,933

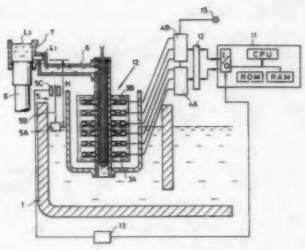
ELECTROMAGNETIC MOLTEN METAL SUPPLY SYSTEM

Noriyuki Motomura, Zama, Japan, assignor to Toshiba Kikai Kabushiki Kaisha

Filed Apr. 3, 1989, Ser. No. 332,174

Int. Cl.[5] C21C *5/42*

U.S. Cl. 266—237 **3 Claims**



1. An electromagnetic molten metal supply system comprising:

a supply tube;

an electromagnetic pump, disposed in a furnace, for maintaining molten metal and for supplying a fixed quantity of molten metal through the supply tube, said pump including an exciting coil arrangement comprising a first exclusive coil for maintaining a surface of the molten metal in the furnace and a second exclusive coil for supplying the molten metal;

a first control device for controlling the first exclusive coil;

a second control device for controlling the second exclusive coil; and

a controller for supplying first and second control signals to said first and second control devices, said controller regulating a predetermined exciting current in accordance with the surface of the molten metal.

4,928,934

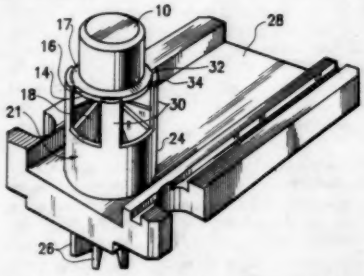
POSITIVE RETENTION CHIP CARRIER

William D. Morton, Jr., Santa Clara, Calif., assignor to Precision Monolithics, Inc., Santa Clara, Calif.

Continuation-in-part of Ser. No. 263,370, Oct. 27, 1988, abandoned. This application Jul. 27, 1989, Ser. No. 386,562

Int. Cl.[5] B65D *73/02*

U.S. Cl. 206—328 **13 Claims**



1. A carrier for an integrated circuit (IC) can, said can having a lower end, a plurality of electrical leads extending from the lower end, a stand-off projecting from the lower end, a

flange around the perimeter of the lower end, said flange having an upper surface, and a surrounding wall extending upward from the flange, the carrier comprising:

a base having a plurality of openings to receive said plurality of leads;

a support section projecting from the base, the support section having a top end for supporting the stand-off and a plurality of openings to receive said plurality of leads; and

at least three stiffly flexible arms projecting from the base and arranged in a generally symmetrical configuration to flex in opposition to each other and bear against the flange of an IC can inserted therebetween, the end of each arm having an inward projection with a lower surface which lodges against the upper flange surface of an IC can inserted between the arms to retain the can in the carrier, said projections extending inwardly from their respective arms by about 0.005–0.01 inch, said projections being tapered so that said arms terminate not more than about 0.02 inches above said lower projection surfaces, whereby substantially the entire surface of said surrounding wall is exposed for printing and said arms avoid substantial obstruction to the placement of printed information on said surrounding wall while the can is retained in the carrier, said projections bearing against the flange of an IC can when the can is inserted between said arms to flex said arms backward to admit the IC can.

4,928,935

MOUNTING ARRANGEMENT FOR AUTOMOTIVE ENGINE OR THE LIKE HAVING MULTIPLE VARIABLE ORIFICES

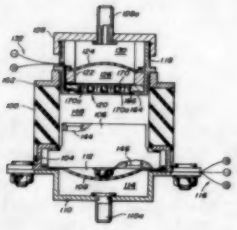
Shinichi Matsui, Yokosuka, Japan, assignor to Nissan Motor Co., Ltd., Japan

Filed Feb. 27, 1989, Ser. No. 315,925

Claims priority, application Japan, Feb. 29, 1988, 63-46542

Int. Cl.[5] F16F *9/34*

U.S. Cl. 267—140.1 **9 Claims**



1. A variable viscosity type vibration damper comprising:

first and second connection assemblies, said first and second connection assemblies being arranged to be connectable to first and second bodies, one of said bodies being subject to vibration;

a hollow elastomeric body, said hollow elastomeric body being fixedly connected with said first and second connection assemblies in a manner to define an enclosed space; and

first and second independent orifice units connected to said first and second connection assemblies respectively, said first and second orifice units being disposed in a manner to partition said enclosed space into a main fluid chamber and first and second auxiliary chambers respectively, said first and second orifice units including means for selectively and individually varying throttling effect provided thereby so that the throttling effect of one of said first and second orifice units can be varied independently of the other.

4,928,936

LOADING APPARATUS

Yukiharu Ohkubo, Machida; Manabu Hosoya, Yokohama; Shinji Miura, Yokohama, and Yuichi Aoki, Yokohama, all of Japan, assignors to Nikon Corporation, Tokyo, Japan

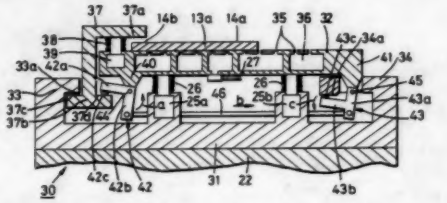
Continuation of Ser. No. 128,307, Nov. 24, 1987, abandoned.

This application Sep. 12, 1989, Ser. No. 406,813

Claims priority, application Japan, Dec. 2, 1986, 61-287309; Dec. 18, 1986, 61-302421

Int. Cl.[5] B25B *1/22*

U.S. Cl. 269—73 **13 Claims**



1. An apparatus for loading a planar subject to be worked at a predetermined level, including:

(a) holding means operative to hold one end portion of the surface of said subject to be worked at a first level; and

(b) regulating means for detecting the thickness of said subject to be worked from the amount of operation of said holding means and regulating the other end portion of the surface of said subject to be worked to a second level on the basis of a result of said detection.

4,928,937

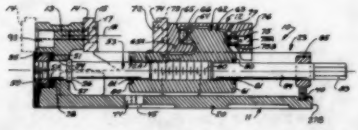
MULTI-PURPOSE MACHINE VISE

Leon M. Bernstein, Minneapolis, Minn., assignor to Kurt Manufacturing Company, Inc., Minneapolis, Minn.

Filed Jun. 10, 1988, Ser. No. 205,465

Int. Cl.[5] B23Q *3/02*

U.S. Cl. 269—136 **13 Claims**



1. A machine vise having a cast unitary body, body including a base plate having side edge portions and end portions, said side edge portions having outer side surfaces, said outer side surfaces defining a plane, a fixed jaw block, and longitudinally extending rails for mounting a movable jaw, a movable jaw mounted on said rails, means for moving the movable jaw along the rails, said rails being spaced apart and extending from an end of the body adjacent the fixed jaw block toward a distal end, web means integral with the base plate for integrally supporting the rails, said web means having outer side surfaces spaced inwardly from the outer side surfaces of the base plate to provide a ledge around the periphery of at least substantial portions of the base plate, and said rails having rail side surfaces extending outwardly from the respective outer side surfaces of said web means to a position closely adjacent the planes of respective side surfaces of said base plate to provide a recess above the ledge at the side edge portions of the base plate, the fixed jaw and movable jaw having jaw side edge surfaces substantially coplanar with the planes of the base plate side surfaces; said rails comprising a pair of laterally spaced apart rails integrally formed with the base plate and webs and which overlie the base plate at the distal end of the base plate, and the rails each having machined surfaces on a lower side

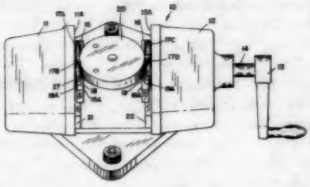
thereof facing toward the base plate and being substantially coplanar, the means for moving the movable jaw comprising a vise screw for actuating the movable jaw rotatably mounted on the body at the fixed jaw end and said vise screw carrying loads on the movable jaw under tension to the fixed jaw end of the body, said vise screw having a non-load carrying remote end portion extending outwardly from the movable jaw toward the distal end of the body, a housing for remotely mounting the remote end portion of the vise screw at the distal end of the body, said housing having surfaces that fit between the spaced apart rails for laterally positioning the housing and having machined shoulder surfaces that engage the machined lower side surfaces of said rails, and force generating screw means threaded through one of the housing and base plate and being threadable to act against a surface of the other of said housing and base plate to urge said machined shoulder surfaces of the housing upwardly to bear against the machined lower surfaces of said rails for compression loading, said housing having a lower end spaced upwardly from the base plate to leave an opening between the webs at the distal end of the base plate and being held on the body only by the compression loading between said housing and base plate.

4,928,938

CLAMPING DEVICE

Leo R. Ross, R.R. #1, Box 333, Kendall Rd., Ashby, Mass. 01431-9770

Filed Apr. 13, 1989, Ser. No. 337,370
Int. Cl.[5] B23Q *1/04*
U.S. Cl. 269—261 **9 Claims**



1. Clamping means for holding a work piece between first and second parallel clamping surfaces that are movable relative to each other, said clamping means comprising:

i. a plurality of clamping members, each said clamping member having a stem portion and a collinear work piece engaging portions, and

ii. first and second support means for supporting said clamping members, each said support means having a planar surface and positioning means for capturing a said stem portion with a portion thereof being external to said support in a tangent plane that is displaced from and parallel to the said planar surface with each said work piece engagement portion being external to said support means whereby the clamping surfaces engage said clamping member stem portions along the tangent plane to move said work piece engaging portions into clamping engagement with the work piece.

4,928,939

LOCATOR AND CLAMPING MEANS FOR A JUG FIXTURE

Michael G. Bell, 9435 Flower St., #125, Bellflower, Calif. 90706, and Robert L. Stevens, 4605 Silver Tip Dr., Whittier, Calif. 90601

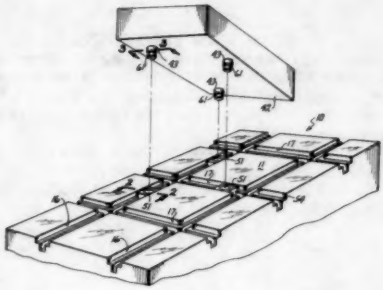
Filed Aug. 3, 1989, Ser. No. 389,167
Int. Cl.[5] B23Q *1/08*
U.S. Cl. 269—309 **5 Claims**

1. In combination, a dowel and a key adopted to be used to secure a jig onto a flat-surface bed of a machine tool wherein said jig has a flat surface and at least one accurately positioned bore having an opening at said flat surface and said bed having a plurality of longitudinal grooves disposed criss-crossing a plurality of transverse grooves formed in the flat surface thereon;

said dowel being symetrical about an axis and disposed removeably fixed and partially within said bore on said jig leaving a portion extending from said flat surface, and

said portion extending from said flat surface having a smaller diameter at its exposed end than its diameter adjacent said jig; and

said key being disposed within one of said grooves and having a pair of opposing sides spaced apart a sufficient



distance so that said key is capable of sliding along said groove, and

said key having a symetrical hole formed therein wherein the diameter of said hole adjacent said top surface is larger than the diameter of said hole extending into said groove;

said dowel includes means for fixing and removing said dowel to and from said bore, said means comprising:

said dowel having an axially aligned well and having a pair of axially aligned slots disposed on opposite sides thereof, and

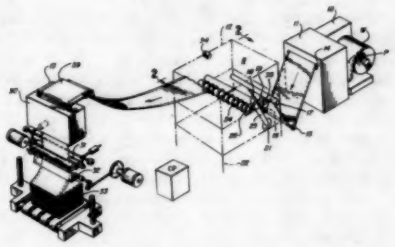
means dispsoed within said well for forcing said slots open while said dowel is disposed within said bore and fixing said dowel therein.

4,928,940

APPARATUS AND METHOD FOR PRINTING SEPARATING CONTINUOUS FORMS INTO FOLDED DISCRETE JOBS INCLUDING ACCUMULATOR

Thomas E. Dash, Aurora, Ill., assignor to Wallace Computer Services, Inc., Hillside, Ill.

Filed Feb. 6, 1989, Ser. No. 306,100
Int. Cl.[5] B41F *13/54*
U.S. Cl. 270—1.1 **5 Claims**



1. A method of printing and separating continuous forms into discrete jobs from a single moving web comprising the steps of advancing said web through a printer at a predeter-

mined speed and thereafter through a job separator at a speed higher than said predetermined speed, cyclically interrupting the advance of said web through said job separator to develop separate stacks of folded web, during said interruption accumulating a length of said web in random loops arrangement in bin means interposed between said printer and said job separator, and sensing the level of the random loops in said bin means for controlling said printer and job separator.

4,928,941

SHEET SORTER WITH STAPLER

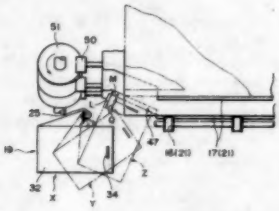
Nobutaka Uto, Yokohama; Hironori Shido; Jun Saito, both of Kawasaki; Masakazu Hirai, Yokohama; Kenji Kobayashi, Tokyo; Koichi Murakami, Yokohama, and Masataka Naito, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 7, 1988, Ser. No. 216,118

Claims priority, application Japan, Jul. 9, 1987, 62-172681; Jul. 30, 1987, 62-191934; Jul. 30, 1987, 62-191936; Aug. 10, 1987, 62-200288; Aug. 10, 1987, 62-200289

Int. Cl.[5] B42B *1/02*

U.S. Cl. 270—53 **15 Claims**



1. A sheet sorting apparatus with a stapler, comprising:

a plurality of bin trays which are arranged substantially vertically with predetermined clearances between adjacent bin trays, which are inclined to provide an inclined sheet receiving surface and which are independently movable substantially in the vertical direction;

bin tray shifting means for moving said plurality of the bin trays stepwisely substantially in the vertical direction to oppose the respective bin trays to a sheet inlet of said sorting apparatus, while expanding the clearance between the bin tray opposed to the sheet inlet and an upper adjacent bin tray to provide a larger clearance than said predetermined clearances;

a shaft extending substantially perpendicularly to an extension of the inclined sheet receiving surface; and

stapling means, supported rotatably about said shaft and having a stapling head movable to above the sheet receiving surface in a lateral direction by rotation about said shaft and an anvil movable to below the sheet receiving surface by the rotation, for stapling the sheets interposed between the stapling head and the anvil;

wherein said bin trays are so disposed that between those ends of adjacent ones of said bin trays which are closer to the sheet inlet are deviated in the direction of movement of the sheet when seen in a direction substantially perpendicular to the sheet receiving surface, and wherein the stapling head is laterally moved using a space provided by the deviation, and wherein said expanded clearance is smaller than a height of the stapling head.

4,928,942

DEVICE FOR FEEDING FLATTENED BOXES IN PACKAGING MACHINES

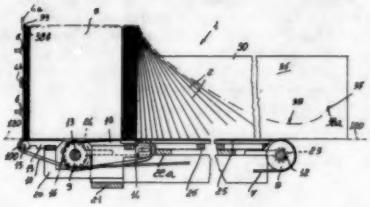
Franco Aiuola, Bologna, and Herbert Rueff, Casalecchio Di Reno, both of Italy, assignors to Azionaria Costruzioni Macchine Automatiche A.C.M.A. S.p.A., Bologna, Italy

Filed Apr. 19, 1988, Ser. No. 183,210

Claims priority, application Italy, Apr. 24, 1987, 3446A/87

Int. Cl.[5] B65H *39/04*

U.S. Cl. 210—58 **18 Claims**



1. A device for feeding flattened boxes from a folding-pasting machine to a packaging machine, said device comprising;

a supporting framework,

at least one box magazine mounted on said framework and defining a box inlet zone, whereat flattened boxes are laid substantially horizontally and sequentially superimposed and a box extraction zone,

abutment means located at said extraction zone for positioning boxes substantially vertically at said extraction zone of said magazine, and means for conveying flattened boxes from said box inlet zone to said box extraction zone,

wherein said means for conveying flattened boxes from said box inlet zone to said box extraction zone upwardly define a single uninterrupted linear advancement plane, and wherein said means for conveying flattened boxes from said inlet zone to said box extraction zone comprise;

first drive means,

a first drive shaft rotatably associated with said framework and being driven by said first drive means,

at least two drive pulleys keyed to said first drive shaft,

intermittent drive means,

a second drive shaft rotatably associated with said framework and being driven by said intermittent drive means,

at least two return pulleys rotatably idly journalled on said second drive shaft,

at least two belts trained around said drive pulleys and said return pulleys and each defining a closed-loop formation,

at least one frame fixed to said fixed framework,

at least two guides supported by said frame,

a plurality of toothed wheels supported by each of said guides and including at least one first toothed wheel and at least one second toothed wheel,

at least one chain trained around each said plurality of toothed wheels, each said chain defining a closed-loop configuration having a central portion,

at least two drive gears keyed to said second drive shaft and engaging said central portion of said closed-loop formation of each said chain, in meshing engagement relationship therewith,

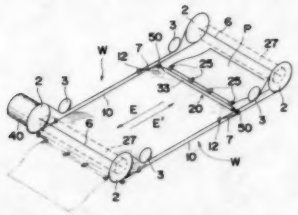
and wherein said guides each rotatably support at least one first toothed wheel and at least one second toothed wheel, and upwardly slideably support at least a portion of said closed-loop configuration defined by each of said chains.

4,928,943

SHEET FEEDING ARRANGEMENT

Toshiki Nishibori, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Nov. 2, 1988, Ser. No. 265,919
Claims priority, application Japan, Nov. 9, 1987, 62-282816
Int. Cl.[5] B65H *5/22*
U.S. Cl. 271—4 **12 Claims**



1. A sheet handling apparatus for copying and transporting sheets which comprises:

an image processing apparatus containing an image processing face,

a sheet processing device disposed above said image processing face and operative to move toward and away from said image processing face,

a sheet transport device including a pair of wrapping connector driving devices constituted by a combination of chains and sprockets, said sheet transport device turning on itself to form a loop which passes between said image processing apparatus and said sheet pressing device in sequential, opposite directions,

a driving means for driving the sheet transport device,

a sheet gripping means connected to said wrapping connector driving device for gripping the edges of the sheet being transported,

a sheet pickup means for successsively selecting the sheets, one-by-one, for distribution to the sheet gripping means,

and a sheet discharge device for receving and transporting sheets received from the sheet transport device, whereby the front and reverse surfaces of said sheet can be successively brought into close contact with the image processing face through the use of the sheet pressing device.

4,928,944

HIGH SPEED SHEET FEEDER SINGULATOR

Roman M. Golicz, Clinton, Conn., assignor to Intelligent Technologies Corporation, Chester, Conn.

Filed Dec. 19, 1988, Ser. No. 286,608
Int. Cl.[5] B65H *5/22;* **B25B** *1/02*
U.S. Cl. 271—6 **17 Claims**

1. A high speed sheet feeder comprising:

a supporting base having a feed end and a delivery end,

an upstanding feed pedestal mounted at the feed end of the base and slanting steeply downward toward a central portion of the base,

a supply ramp mounted on and spaced above the base, slanting downward toward the feed pedestal and defining therewith a feed slot region therebetween,

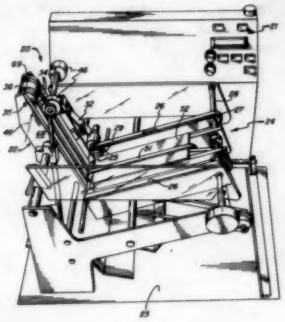
sheet supply means mounted on the supply ramp and positioned to support a large plurality of individual sheets stacked as a brick thereon with their edges facing the supply ramp and with the face of the forwardmost sheet leaning against the pedestal above the feed slot region,

a pair of endless flexible feed belts mounted on power-driven roller means on the pedestal with substantially straight and parallel portions of their respective outer traction surfaces spaced apart along descending paths facing said forwardmost sheet, defining a feed plane, and traveling in synchronism downward toward the feed slot region,

a downwardly curving central singulator positioned at the feed end of the supply ramp extending across the feed slot region and the feed plane between the pair of feed belts, and presenting a traction face to the side of the forwardmost sheet opposite to said feed belts' traction surfaces,

an endless flexible discharge belt mounted on power-driven roller means, below the feed slot region, having a downwardsloping upward-facing traction run crossing the feed plane below the supply ramp, midway between the descending feed belt paths,

a discharge pinch roller rotatably mounted beneath the supply ramp tractively engaged with and depressing the traction run of the discharge belt to produce tractive engagement thereof with the pinch roller over an arcuate sector of the pinch roller leading to a delivery path extending between the base and the supply ramp toward the delivery end of the base,



and means driving the discharge belt's traction run at a substantially faster linear velocity than the velocity of the synchronized feed belts traveling downward in the feed plane,

whereby each forwardmost sheet of the brick of stacked sheets in turn is tractively engaged by the feed belts with its lower edge arched between the feed belts by the singulator, thereby breaking the fibre-lock friction bond between the forwardmost sheet and its next adjacent sheet, and whereby the forwardmost sheet is propelled downward edgewise by the synchronized feed belts along a feed path substantially coinciding with the feed plane, with the centered discharge belt receiving and guiding its lower edge between the discharge belt and the discharge pinch roller, through the arcuate sector of their tractive engagement, thereby propelling the sheet along the delivery path.

4,928,945

SHEET COLLATING MACHINE WITH AUTOMATIC DOUBLE FEED PREVENTION

Terje Söderberg, Lidingo; Rolf Södersteen, Enskede, and Ulrik Töreman, Bandhagen, all of Sweden, assignors to Plockmatic International AB, Stockholm, Sweden

Filed Mar. 15, 1989, Ser. No. 323,704
Claims priority, application Sweden, Mar. 15, 1988, 8800939
Int. Cl.[5] B65H *7/18, 3/06, 1/04*
U.S. Cl. 271—9 **7 Claims**

1. A device for collating sheets in an elongated sheet collating machine, comprising:

a conveying path (3),

a conveying belt (5), and

conveying members,

said conveying members comprising a plurality of conveying and press rollers (4) along one side of which a corre-

sponding plurality of backing rollers (6) are disposed, said conveying members being disposed along said conveying path,

a plurality of bins (1),

said bins being located in a longitudinal direction of the machine below said conveying path and being disposed for holding sheets of paper in the form of stacks (2),

said conveyor belt running between said conveying and press rollers and said backing rollers, with one of said conveying and press rollers being disposed after each individual bin,

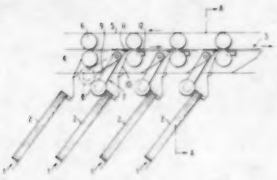
a plurality of feed-up devices (7),

a plurality of feed-up wheels (8), and

a plurality of drive means (16–22) individually connected to said feed-up wheels,

said feed-up devices each comprising a lifting device (23) and at least one of said feed-up wheels, and being individually disposed at an associated one of said bins,

each feed-up device being pivotal between a lowered position, in which said at least one feed-up wheel engages a respective stack of sheets for feeding up one sheet at a time towards said conveying path, and a raised position, in which said at least one feed-up wheel is disengaged from said stack, and being at said associated bin connected to an associated one of said drive means disposed at said associated bin,



a control device,

each of said lifting devices being individually connected (24) to an associated one of said drive means and to said control device for individually causing said associated drive means together with said lifting device to lift the associated feed-up device to a raised position,

a plurality of sensors in the form of microswitches (12),

said control device being connected to said sensors, and a plurality of spring members (11),

said spring members extending across said conveying path,

said microswitches being individually maintained actuated by an associated one of said spring members when no sheet protrudes between a respective press roller and said conveyor belt,

each spring member being moved from contact with the associated sensor when a sheet passes the latter,

and each of said sensors delivering, when a sheet is not advanced within a predetermined period, a signal to said control device for automatically causing said associated drive means to lift the associated lifting device and feed-up device to said raised position, and wherein each of said drive means comprises a reversible electric motor (17), which is connected to at least one of said feed-up wheels over a drive shaft (16) and a power transmission, with a member (18) in the power transmission being connected to said drive shaft via a first free wheeling hub (19).

4,928,946

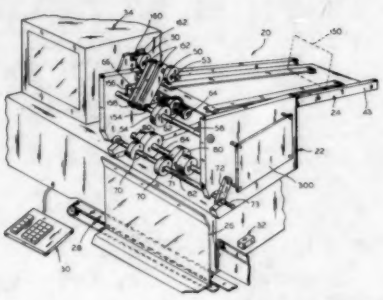
VERTICAL FEED MECHANISM FOR DOCUMENTS

Eduard Svyatsky, Chicago; Jerry W. Loftis, Libertyville, and Thomas Faber, Skokie, all of Ill., assignors to Bell & Howell Company, Chicago, Ill.

Filed May 25, 1988, Ser. No. 198,474

Int. Cl.[5] B65H *5/06*

U.S. Cl. 271—10 **18 Claims**



1. An improved document feed mechanism for feeding documents in a vertical direction through at least two stations including means for shingling said documents in at least one station by having successive ones of said documents overlap one another a predetermined amount to thereby compress the amount of vertical space required for the feeding operation as opposed to the space that would be required if said documents were fed top edge to bottom edge, respectively, while exposing indicia on a document in at least one of said stations, said feed mechanism further including means for delivering documents to said feed mechanism located at an upper elevation and means for transporting documents away from said feed mechanism at a lower elevation, and said feed mechanism controlling and moving said documents between said elevations through a plurality of stations, at least one in-feed roller for moving a facing document downwardly from the end of an edge-stacked stack of documents being moved broadside by said delivery means towards said feed mechanism, said feed mechanism also including as one of said plurality of stations a separation station that insures that only one document is moved downwardly from said stack by said at least one in-feed roller, one of said plurality of stations being a pre-conditioning station having a drive roller that moves a separated document with a predetermined torque and coefficient of friction against one face of said document, guide diverter means acting on the other face of said document to move said document to a predetermined offset location relative to its predetermined vertical path through said feed mechanism.

4,928,947

SHEET FEEDERS FOR SOFT COATED SHEET MATERIAL

Jack Beery, Centerville, Ohio, assignor to The Mead Corporation, Dayton, Ohio

Continuation-in-part of Ser. No. 125,841, Nov. 27, 1987, abandoned. This application Nov. 17, 1988, Ser. No. 271,485

Int. Cl.[5] B65H *3/02*

U.S. Cl. 271—24 **2 Claims**

1. In a sheet feed mechanism in which single sheets which have a soft of pressure sensitive coating are selectively fed in a feed direction from the top of a tray of such sheets, the improvement to prevent scuffing or marking of the sheet immediately underlying the top sheet being fed, comprising:

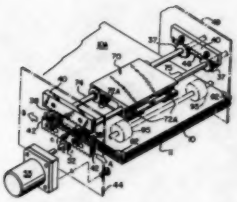
sheet feed means positioned adjacent the top of said tray, said sheet feed means including a pad support body,

a pad of elastomer material mounted on a bottom surface of

said support body, and defining a lower generally planar sheet-engaging surface,

said pad being relatively thin and having a length in said feed direction, which is a substantial multiple of the thickness of said pad to provide rigidity of said pad in said feed direction,

drive means for said pad support body including a generally vertically oriented slot extending transversely through said body adjacent a leading edge thereof in relation to said feed direction,



a drive shaft received in said slot movable against a wall of said slot in said feed direction while permitting the weight of said pad support body to rest on a top sheet in said tray of sheets, and

means for moving said shaft in said feed direction against said slot wall to carry said pad support body in said feed direction without inducing any substantial tipping force on said pad.

4,928,948

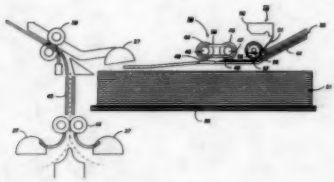
FEEDER REVERSING DRIVE

Donato D. Evangelista, Webster; Norman E. LaTour, Rochester, and Bobby Kirven, Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Mar. 23, 1989, Ser. No. 327,500

Int. Cl.[5] B65H *7/00, 3/06, 3/04, 3/52*

U.S. Cl. 271—110 **14 Claims**



1. Apparatus for feeding sheets comprising a surface over which a sheet may be fed, means for feeding sheets over said surface comprising at least one feed roll rotatably driven in the feeding direction, at least one nudger roll upstream of said feed roll for urging a sheet to be fed toward said feed roll, said at least one nudger roll being pivotally supported about said at least one feed roll, drive means to rotate said feed roll in the feeding direction, an endless belt drive means to couple the rotational movement of said feed roll to said nudger roll, means responsive to identified feeding conditions to stop said drive means and terminate the rotation of said feed roll in the feeding direction and means to reverse the direction of rotation of said feed roll whereby the endless belt drive coupling reverses the direction of rotation of the nudger roll and creates a drive torque on the nudger roll which urges it upwardly away from said feed surface.

4,928,949

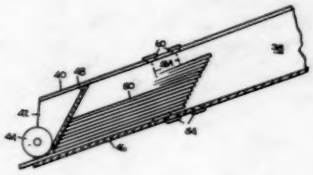
LOW PAPER INDICATOR

James S. Ramsey, Shelton, and John L. Lorenzo, Southbury, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Dec. 30, 1988, Ser. No. 292,052

Int. Cl.[5] B65H *7/00, 43/00*

U.S. Cl. 271—111 **12 Claims**



1. A document feeder having a detector arrangement for detecting a partially depleted supply of documents, said detector arrangement comprising:

a feeder having a support surface for supporting a supply of documents in a stack,

means for aligning the stack of documents so that trailing edges of the documents form an acute angle with said support surface, and

sensing means mounted in said feeder for sensing a partial supply of documents, said sensing means being positioned wherein when said feeder has a fully supply of documents said sensing means is between the trailing edges of a bottom document and a top document in the stack of documents.

4,928,950

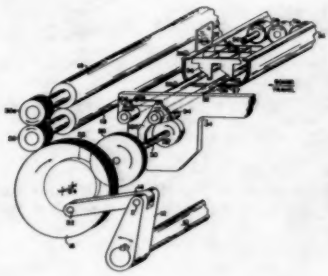
ROTARY TYPE FEEDER MACHINES AND METHODS

Louis M. Sardella, 19 Pickburn Ct., Cockeysville, Md. 21030

Continuation of Ser. No. 936,953, Dec. 1, 1986, which is a continuation of Ser. No. 674,294, Nov. 23, 1984, abandoned. This application Aug. 3, 1988, Ser. No. 228,399

Int. Cl.[5] B65H *3/06*

U.S. Cl. 271—112 **11 Claims**



1. A method of making a lead edge feeder which feeds corrugated paperboard individually from the bottom of a stack of corrugated paperboard without the need for a complex indexing transmission, comprising the steps of:

(a) connecting a rocker shaft to a rocker gear by means for rotating said rocker gear in a feed direction and then in a direction opposite to said feed direction;

(b) coupling said rocker gear to rotatingly drive feed means alternately in said feed and opposite directions; and

(c) providing means to intermittently move the stack of corrugated paperboard and the feed means relative to each other so that initial contact between a lowermost sheet of corrugated paperboard to be fed and the feed means occurs when the feed means are rotating in said direction opposite to said feed direction.

4,928,951

AUTOMATIC PAPER FEED DEVICE

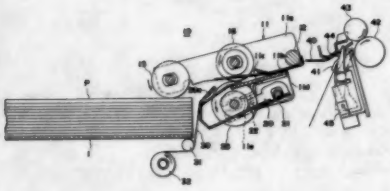
Kazuyuki Fukui, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Oct. 24, 1988, Ser. No. 261,993

Claims priority, application Japan, Oct. 28, 1987, 62-272885

Int. Cl.[5] B65H *3/06*

U.S. Cl. 271—113 **9 Claims**



1. An automatic feed device for feeding sheets from a stack thereof one at a time in a sheet feed direction, said device comprising:

a feed frame including a shaft having an axis of rotation about which said feed frame is pivotally supported in the device;

a first feed roller rotatably supported by said feed frame about an axis of rotation of said first feed roller spaced from the axis of rotation of said feed frame;

a second feed roller rotatably supported by said feed frame about an axis of rotation of said second feed roller spaced from the axis of rotation of said feed roller, said second feed roller disposed downstream of said first feed roller with respect to the feed direction in which sheets are fed in the device;

a separating roller, and a support means rotatably supporting said separating roller in the device in pressing contact with said second feed roller, said support means operatively engaged with said feed frame in a manner in which said separating roller supported by said support means moves in conjunction with pivotal movement of said feed frame in the device about the axis of rotation of said feed frame; and

guide means disposed adjacent said separating roller for guiding sheets in the feed direction in the device to the nip between said second feed roller and said separating roller in pressing contact therewith.

4,928,952

MECHANICAL DOCUMENT FEED APPARATUS

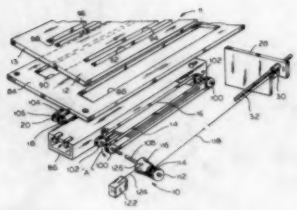
Eduard Svyatsky, Chicago, Ill., assignor to Bell & Howell Co., Chicago, Ill.

Filed Oct. 16, 1987, Ser. No. 109,491

Int. Cl.[5] B65H *1/02*

U.S. Cl. 271—150 **1 Claim**

1. In a document feed system including means for advancing a stack of documents arrayed in a feed tray towards a document removal assembly disposed at one end of said feed tray for removing documents one at a time from said stack of documents in said feed tray, said means for advancing said stack of documents including belt means disposed at the bottom of said feed tray and in contact with said stack of documents, said belt means extending around first and second pulley means, one of said pulley means being rotated by a shaft, spool means connected to said shaft, said spool means having a constant diameter section and a variable diameter section, back plate means movably supported by said feed tray means for movement along said feed tray mean and disposed in abutting relation to the last document in said stack of documents to apply a compressive force to said stack of documents, linkage means connecting said back plate means to said constant diameter portion of said spool means, said variable diameter section of said spool means being connected to a constant force power source which applies a variable pressure force to said back plate



means through said variable diameter section of said spool means and said linkage means as said back plate advances in said feed tray means at a constant rate of speed and said constant force power source drives said belt means at said constant rate of speed, whereby said back plate and said belt means advance at the same rate of speed toward said document removal assembly as the pressure force applied by said back plate to said stack of documents decreases progressively as said stack of documents becomes shorter.

4,928,953

ROTARY SHEET FEEDER

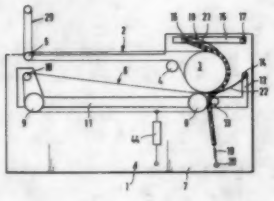
Karl-Fritz Heina, Murrhardt; Horst Schwarz, and Wolfgang Weber, both of Grosserlach, all of Fed. Rep. of Germany, assignors to Maschinenbau Oppenweiler Binder GmbH & Co., Fed. Rep. of Germany

Filed Aug. 31, 1988, Ser. No. 239,199

Claims priority, application Fed. Rep. of Germany, Sep. 25, 1987, 3732419

Int. Cl.[5] B65H *29/00*

U.S. Cl. 271—185 **11 Claims**



1. A rotary sheet feeder comprising:

(a) a feeder frame;

(b) an upper feeder table mounted on said feeder frame for carrying imbricated stacks of sheets into the rotary sheet feeder, said upper feeder table comprising a first endless belt conveyor, a reversing drum mounted for rotation about a drum axis and at least one roller, said first endless belt conveyor being wound around said reversing drum and roller and having a delivery zone below said reversing drum;

(c) flexible guide means having an upper end and a lower end and being disposed about the periphery of said reversing drum for pressing said stacks of sheets against said first

endless belt conveyor as it travels around said reversing drum;

(d) means for supporting the upper end of said flexible guide means above said upper feeder table;

(e) tensioning means attached to the lower end of said flexible guide means for tensioning said flexible guide means;

(f) a withdrawal table which is pivotably mounted on said feeder frame at a pivot axis which is parallel and spaced apart from said drum axis, said withdrawal table being disposed below said reversing drum for receiving imbricated stacks of sheets from said delivery zone and carrying them out of the delivery zone, said withdrawal table comprising at least two further rollers and a second endless belt conveyor wound around said further rollers, one of said further rollers being located adjacent said delivery zones;

(g) means for urging said withdrawal table upwardly towards said reversing drum; and

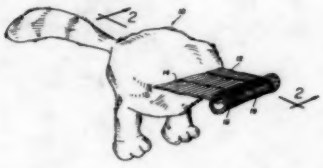
(h) further support means mounted on said withdrawal table adjacent said delivery zone for supporting a portion of said flexible guide means intermediate said upper and lower ends, said portion of said flexible guide means curving away from said reversing drum around said further support means between said one further roller and said further support means.

4,928,954

NOVELTY FIGURE WITH ATTACHMENT MEANS

Anthony H. Levine, Tarzana, and Eduard A. Jaeger, Encino, both of Calif., assignors to Krushed Kritter Kompany of California, Inc., Tarzana, Calif.

Filed Apr. 18, 1988, Ser. No. 182,426
Int. Cl.[5] A63J *5/00*
U.S. Cl. 272—8 N **2 Claims**



1. A novelty device comprising: (a) a portion of a recognizable object having an end that appears to be missing; (b) a flexible band of material having a first end and a second end said first end of said flexible band being attached to said portion of the recognizable object that appears to be missing; (c) a restraining member comprising a tubular member attached to said second end of said flexible band of material.

4,928,955

TOY HAVING SLIDING RAIL

Chuan-Tien Chuang, No. 40, Lane 174, Ta Hsin St., Tainan, Taiwan

Filed May 25, 1989, Ser. No. 356,556
Int. Cl.[5] A63H *13/20*
U.S. Cl. 272—31 R **4 Claims**

1. A toy comprising:

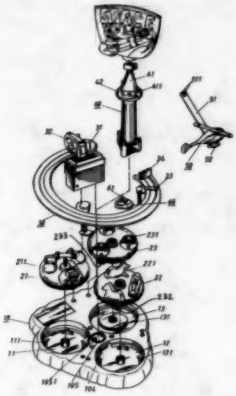
a base adapted to receive a power means; a curved sliding rail mounted above said base, and including a first end having a platform and an adjacent separating means and a second opposite end having a stopping means and an adjacent obstacle means;

a tower secured on said base and having thereon a waved continuous guiding surface;

a shaft rotatably mounted in said tower and adapted to be driven by said power means;

a flying piece having a carrying means and an extended arm which is pivotally attached to said shaft and guided to revolve along said wave guiding surface; and

a sliding piece supportable by said platform including means engagable by said carrying means so as to be capable of



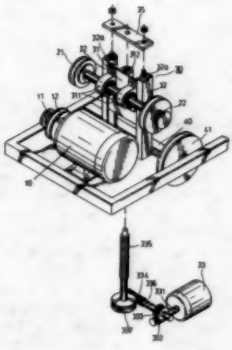
being carried by said flying piece when it stops at said stopping means to fly over said obstacle means and capable of being separated by said separating means from said carrying flying piece to drop down on said sliding rail to slide to said stopping means.

4,928,956

SPEED-ADJUSTING MECHANISM OF A TREAD MILL

Chao-Yang Chen, No. 585, San Feng Rd., Feng-Yuan City, Taiwan

Continuation-in-part of Ser. No. 121,355, Nov. 16, 1987, Pat. No. 4,792,134. This application Sep. 13, 1988, Ser. No. 244,046
Int. Cl.[5] A63B *23/06*; F16H *9/12*
U.S. Cl. 272—69 **5 Claims**



5. A speed adjusting transmission mechanism for adjusting the speed of a rotative belt of a tread mill which comprises

a driving motor having an output shaft,

a driven shaft associated with said rotative belt,

a transmission shaft provided between said output shaft and said driven shaft,

a pair of spaced apart vertical guide supports each of which has a vertical rail groove,

a shaft holding means mounted slideably on said guide supports and carrying said transmission shaft, said means

being movable along said rail groove to increase or decrease distances between said transmission shaft and said output and driven shafts,

a first pulley mounted on said output shaft,

a second pulley mounted on a first end of said transmission shaft,

a third pulley mounted on a second end of said transmission shaft,

a fourth pulley mounted on said driven shaft,

a first V-belt passing over said first pulley and said second pulley,

a second V-belt passing over said third pulley and said fourth pulley,

at least one of said pulleys having a structure including two cone-shaped discs, one of which is slideable relative to the other, and

means for displacing said shaft holding means, thereby to change a distance between said transmission shaft and at least one of said output and said driven shaft and to position at least one of said first and second V-belts more or less deeply into at least one of said pulleys,

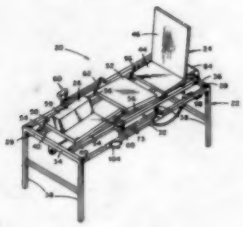
whereby said fourth pulley is rotated at slower or faster speeds, to drive the rotative belt at slower or faster speeds.

4,928,957

EXERCISE APPARATUS FOR ACTIVELY EXERCISING THE UPPER BODY WHILE PASSIVELY EXERCISING THE LOWER BODY

Joel P. Lanier, Nashville; Tamuel A. Hall, Chattanooga, and Kent R. Moore, Hixson, all of Tenn., assignors to University of Tennessee Research Corporation, Knoxville, Tenn.

Filed Dec. 2, 1988, Ser. No. 279,470
Int. Cl.[5] H63B *69/06*
U.S. Cl. 272—72 **6 Claims**



1. Exercise apparatus for actively exercising the upper body of the user while passively exercising the lower body of the user comprising:

a frame;

a seat mounted upon the frame for generally horizontal movement relative thereto between forward and rearward positions, said seat having a bottom portion for supporting the buttocks of the user and a back portion for supporting the user's back in an upright position when the user is seated upon the bottom portion;

leg-supporting means disposed forwardly of the seat including two elongated sections for separately supporting a corresponding one of the upper and lower leg portions of at least one leg of the user, one of said two sections being connected at one of its ends to the seat for hinged movement relative thereto about a first pivot axis, the other of said two sections being connected at one of its ends to the frame for hinged movement about a second pivot axis, and said two sections being connected to one another at the ends thereof opposite said first and second pivot axes for hinged movement relative to one another about a third pivot axis so that when the user is operatively seated upon the seat with his leg operatively supported by the leg-supporting means and the seat is moved forwardly and rearwardly relative to the frame, said two sections hingedly move relative to one another, said one section hingedly moves relative to the seat and said other section hingedly moves relative to the frame in a manner effecting a folding and unfolding of the two sections and a bending of the user's leg supported by the leg-supporting means at the waist and at the knee; and

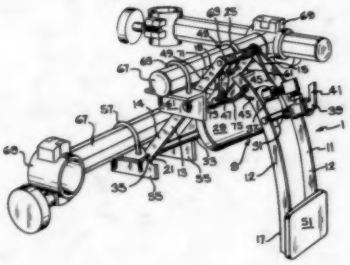
handgrip means fixed in a stationary condition with respect to said frame and at about the same horizontal level as the chest of the user when the user is seated upon the seat enabling the user to push and pull upon the handgrip means with his arms to alternately extend his arms from and pull in his arms toward his chest as his hands are maintained at about chest level and to effect forward and rearward movement of the seat along the frame as the user's hands move away from and toward the user's chest and the direction of pressure applied upon the handgrip means from the hands is generally parallel to the direction of movement of the seat along the frame so that the action of the user's upper body simulates a rowing action and so that the hinged movement of said two sections of the leg-supporting means effects a bending of his supported leg at the waist and knee.

4,928,958

EXERCISE DEVICE

Jeffrey J. Sabin, Rossford, Ohio, assignor to Medical College of Ohio, Toledo, Ohio

Filed Mar. 7, 1988, Ser. No. 165,040
Int. Cl.[5] A63B *21/008*
U.S. Cl. 272—96 **13 Claims**



1. An exercise device for the soleus muscle of the lower extremities to reduce deep vein thrombosis as a complication for both trauma and post-operative patients that can be mounted on a support comprising:

a frame having a first leg and a second leg, said first and second legs each having a first end and a second end, said first end of said first and second legs being pivotally connected;

a means for providing resistance being connected to the first and second legs, said resistance means having a cylinder with a movable piston positioned in the cylinder and a rod connected to the piston and extending from the cylinder, the cylinder being connected to said second leg of said frame and said rod being connected to said first leg, a discharge port positioned in said cylinder on the side of said piston that is opposite to the side of said piston where said rod is connected, whereby advancing said second end of said first leg towards said second leg causes said piston to move in said cylinder and to discharge fluid from said discharge port to provide resistance to the movement of said second leg;

a resilient member connected to said second leg, said resilient member acting to move said second end of said first leg away from said second leg;

a control means for varying the resistance of said resistance

means, said control means being a valve that is operatively connected to said discharge port, said valve controlling the effective opening of said discharge port to control the resistance provided by said resistance means; and,

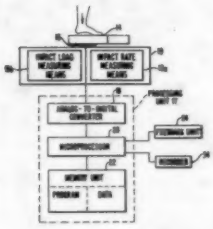
means for mounting said frame to a support.

4,928,959

METHOD AND DEVICE FOR PROVIDING ACTIVE EXERCISE TREATMENT FOR A PATIENT SUFFERING FROM A BONE DISORDER

C. Andrew L. Bassett, and Ian A. Cook, both of Bronxville, N.Y., assignors to Osteo-Dyne, Inc., Charlotte, N.C.

Filed Dec. 16, 1988, Ser. No. 285,420
Int. Cl.[5] A63B *23/04*
U.S. Cl. 272—96 **21 Claims**



6. A device for providing active exercise treatment for increasing the amount, strength and proper anatomical distribution of skeletal tissue in a patient suffering from a bone disorder by causing a desired impact load value to be imparted to the patient at a desired impact rate value such that the impact at the desired load value and rate value causes said patient's skeletal tissue to generate an electrical signal having the majority of its energy between 0.1 Hz and 100 KHz, with notable energy distribution in the range of 6 to 16 Hz, the device comprising:

impact generating means for producing an impact load to the patient along the axis of a bone experiencing the bone disorder when struck by the patient;

sensing means, operatively connected to said impact generating means, for forming an impact signal indicating the impact load generated when the impact generating means is struck by the patient;

measuring means including impact load measuring means, coupled to said sensing means, for receiving the impact signal from the sensing means and measuring the impact load generated from said striking of said impact generating means; and impact rate measuring means, coupled to said sensing means, for receiving the impact signal from the sensing means and measuring the rate of striking said impact generating means by said patient;

processing means, coupled to said impact load measuring means and to said impact rate measuring means, for comparing the measured impact load with said desired impact load values and for comparing the measured impact rate with the desired impact rate values to determined a success indicator value indicating the difference between said desired impact load and impact rate values and the measured impact load and impact rate values;

feedback means, coupled to said processing means, for converting said success indicator value to feedback perceivable by said patient in the active exercise treatment; and

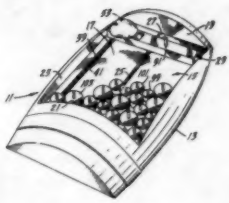
recording means, coupled to said processing means, for recording said determined success indicator value of the active exercise treatment.

4,928,960

LATCH & LATCH RELEASE MECHANISM FOR A GAME

Gordon A. Barlow, Highland Park, Ill., assignor to Gordon Barlow Design, Skokie, Ill.

Filed Jun. 5, 1989, Ser. No. 361,570
Int. Cl.[5] A63F *9/00*
U.S. Cl. 273—1 GG **1 Claim**



1. In a game having a sliding bar biased for movement in one direction across a base and adapted to be held stationary only by engagement with an entrapped matrix of playing pieces located on the base, an indicator means carried on said sliding bar and formed and adapted to swing to an upright position when said sliding bar moves from a stationary position, a signal means including an indicator pivotally mounted on the sliding bar for movement between a generally horizontal and a generally upright position, means to bias said indicator to said upright position, latch means carried by said indicator and engageable with said sliding bar to hold said indicator in its horizontal position, a trip mechanism to release said latch means when said sliding bar moves in its biased direction, said trip mechanism including a finger formed on said indicator and engageable with any one of a series of teeth formed on said base to tilt the indicator and release the latch from the sliding bar when the bar moves in its biased direction, the improvement comprising:

a trip finger mounted for vertical movement between a tooth-engaging position and a tooth-clearing position to permit the indicator to be latched to the sliding bar in any position of the sliding bar relative to the teeth.

4,928,961

WEIGHT LIFTING APPARATUS

Raymond Madden, 222 Woodcroft Rd., Baden, Pa. 15005

Filed Sep. 30, 1988, Ser. No. 252,163
Int. Cl.[5] A63B *13/00*
U.S. Cl. 272—123 **14 Claims**

1. A bench press apparatus comprised of a back and a pair of sides attached to the back each side comprised of:

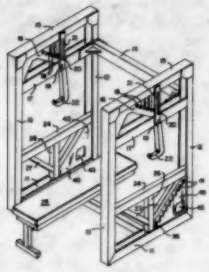
a. a base;

b. a top;

c. at least one upright attached to and between the base and the top; and

d. a hook having a mouth of sufficient size to hold one end of a barbell at a point within the mouth and pivotably attached to the top so that the hook will pivot through a plane which passes through the base and the top and will

not rotate about a vertical axis and that the point will move through an arc when the hook is pivoted, said arc



being created when a lifter moves a barbell from a position above his eyes to a position directly above his shoulders.

4,928,962

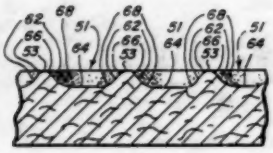
GRIP ENHANCED FOOTBALL

Charles O. Finley, 155 North Michigan Avenue, Chicago, Ill. 60601

Filed Sep. 8, 1989, Ser. No. 404,663

Int. Cl.[5] A63B *41/08*

U.S. Cl. 273—65 E G **5 Claims**



5. A grip enhanced prolate spheroidal football comprising a cover having an exterior surface provided with an intaglio pattern, said pattern including a plurality of laterally spaced recesses, each of said recesses having a substantially crater-like configuration with converging side walls, and a network of interconnected ridges separating adjacent recesses, each ridge in cross section having a narrow outer surface, sides diverging from the outer surface, and rounded segments interconnecting the outer surface to the sides.

4,928,963

RACKET, PARTICULARLY A TENNIS OR SQUASH RACKET

Reinhold Garbosch, Obertorstr. 1, D-7778 Markdorf 1, Fed. Rep. of Germany

PCT No. PCT/DE87/00474, § 371 Date Aug. 23, 1988, § 102(e) Date Aug. 23, 1988, PCT Pub. No. WO88/03040, PCT Pub. Date May 5, 1988

PCT Filed Oct. 21, 1987, Ser. No. 243,024

Claims priority, application Fed. Rep. of Germany, Oct. 25, 1986, 3636470

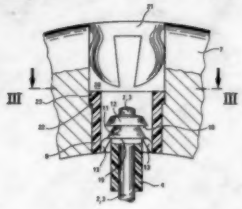
Int. Cl.[5] A63B *51/00, 51/14*

U.S. Cl. 273—73 D **11 Claims**

1. A racket assembly including a frame extending around a generally planar head area and having a plurality of holes therein extending in the plane of the area and opening into the latter, a plurality of strings arranged in said area, and connector structure for securing the ends of the strings in respective corresponding holes, said connector structure including a string connector assemblage comprising:

a coupling element rigidly secured to one end of a said string and including a shoulder surface facing away from said one end and toward the other end of the string; and

a locating element in the corresponding hole for said one end of the string and having an abutment surface facing away from said area,



said string and said coupling element being adapted to be pushed into said corresponding hole together so that said surfaces become engaged, without any further manipulations, to hold the coupling element and the string in a predetermined string tensioning position relative to the racket frame.

4,928,964

REEL DRIVING DEVICE FOR USE IN THE SLOT MACHINE

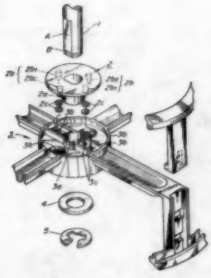
Kikuo Nakamura, Iruma, Japan, assignor to Sigma Incorporated, Tokyo, Japan

Filed Nov. 1, 1988, Ser. No. 265,711

Claims priority, application Japan, Nov. 13, 1987, 62-287928

Int. Cl.[5] A63F *5/04*

U.S. Cl. 273—143 R **17 Claims**



1. A reel driving device comprising:

a drive disk having at the center thereof a drive shaft fixing boss for receiving a drive shaft of a motor and fixing the drive shaft relative thereto, and impact mitigating means including boss members for mitigating an impact force of said motor, said boss members being integral with said drive disk and being symmetrically disposed about said drive shaft fixing boss; and

a reel having holes for receiving said drive shaft fixing boss and said impact mitigating boss members formed at corresponding positions thereon.

4,928,965

GOLF CLUB AND METHOD OF DESIGNING SAME

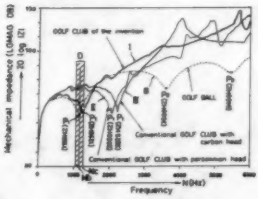
Tetsuo Yamaguchi, and Hiroomi Matsushita, both of Kobe, Japan, assignors to Sumitomo Rubber Industries, Ltd., Kobe, Japan

Continuation-in-part of Ser. No. 753,624, Jul. 10, 1985, abandoned. This application Apr. 14, 1988, Ser. No. 181,523

Claims priority, application Japan, Jul. 10, 1984, 59-143429; Jun. 12, 1985, 60-127752

Int. Cl.[5] A63B *53/04*

U.S. Cl. 273—78 **18 Claims**


GOLF CLUB of the invention
GOLF BALL
Conventional GOLF CLUB with carbon head
Conventional GOLF CLUB with persimmon head
Frequency

17. A golf club for providing an increased ball travelling distance comprising a club head having a primary natural frequency within a range of 600 Hz to 1,600 Hz.

4,928,966

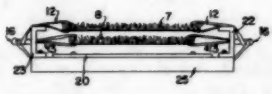
GROUND SIMULATOR

Omer E. Miller, 416 Dunes Wildwood Trail, Myrtle Beach, S.C. 29577

Filed Mar. 22, 1989, Ser. No. 327,136

Int. Cl.[5] A63B *69/36*

U.S. Cl. 273—195 A **19 Claims**



1. A golf shot practice device simulating the conditions of a natural surface comprising:

(a) a frame;

(b) a first surface layer for supporting a golf ball thereon;

(c) at least one second layer located below the top surface layer and vertically spaced therefrom so as to normally be out of contact with the first surface layer;

(d) first connecting means connecting the first surface layer to the frame and permitting the first surface layer to engage said second layer in response to the downward deflection of said first layer by the force of a swing golf club head thereagainst; and,

(e) second connecting means connecting the at least one second layer to the frame.

4,928,967

MAP BOARD GAME

Ann S. Woodliff, P.O. Box 9938, Seattle, Wash. 98109

Filed Oct. 10, 1989, Ser. No. 419,316

Int. Cl.[5] A63F *3/00, 9/18*

U.S. Cl. 273—254 **8 Claims**

1. A board game comprised of:

a board having a map of the world surrounded by a playing path divided into sections that identify major regions of the world; a plurality of world businesses, each major region representing at least one of said businesses a plurality of transportation cards, each of said transportation cards indicating various modes of transportation and indicating the sections which said player blocks are allowed to be moved to; a plurality of player blocks; a plurality of question cards corresponding to each of said major regions, each question card comprises a question relating to one of said major regions and indicia thereon depicting a business of said major region; world market currency in

various denominations; a world market business listing; a transport listing; and business certificates corresponding to each of said plurality of world businesses, wherein each business certificate comprising said indicia depicting a business, and a monetary value indicating the cost to buy said business.

4,928,968

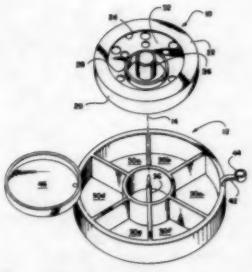
SPINNING TOP AND PROJECTILE GAME

Paul Gebert, 4 Benham Cir., Cartersville, Ga. 30120

Filed Jun. 27, 1989, Ser. No. 371,923

Int. Cl.[5] A63B *67/12, 69/40*; A63F *9/16*

U.S. Cl. 273—357 **17 Claims**



9. An apparatus, comprising:

a bottom member having a plurality of pockets;

a top member having a base with a plurality of openings therein, a sidewall attached to said base and a cover having a central opening attached to said sidewall;

a spindle connecting said top and bottom members, said top member being rotatable about said spindle whereby each of said openings is vertically aligned with each of said pockets during each revolution of said top member; and

a flipper having a cup thereon and being mounted on said bottom member at a location sufficient for flipping a projectile from said cup toward said opening is said cover of said top member, said pocket adjacent said flipper having a negative number thereon.

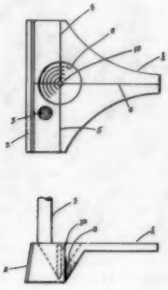
4,928,969
ARROWHEAD
Wesley S. Nagatori, P.O. Box 845, Captain Cook, Hi. 96704
Filed Aug. 7, 1989, Ser. No. 390,982
Int. Cl.[5] F41B 5/02
U.S. Cl. 273—422 8 Claims

1. An arrowhead assembly comprising,
a primary delta shaped blade formed with an elongate axial slot and a secondary delta shaped blade receivable within the axial slot orthogonally relative to the primary blade, and
the primary blade including an elongate axially aligned rearwardly extending shaft wherein the secondary blade includes a positioning stem extending axially rearwardly of the secondary blade of a second length less than that defined by a first length of the extending shaft, and
a ferrule including orthogonally arranged first and second bisecting slots formed through a forward end of the ferrule to receive and align the primary and secondary blades relative to one another.

4,928,970
BINGO CHIP DISPENSER
Richard G. Latimer, Jr., 12 W. 4th St., Oswego, N.Y. 13126
Filed May 5, 1989, Ser. No. 347,587
Int. Cl.[5] A63F 9/00
U.S. Cl. 273—148 R 7 Claims

1. A bingo chip dispenser for selectively depositing bingo chips onto a playing surface, comprising,
an elongate cylindrical body including a through-extending opening at an upper end and including a floor at an opposed end, the upper end includes a lid member selectively closing the upper end overlying the opening, and
a first finger engagement member directed orthogonally outwardly of an exterior surface of the cylindrical body, and
a second finger engagement member aligned with the first finger engagement member and formed contiguously thereto, and
including a plunger positioned within the first finger engagement member directed diametrically interiorly of the cylindrical body, and
an opening positioned adjacent the floor diametrically opposed to the plunger and receiving a bingo chip directed through the opening when the plunger is in a contracted orientation relative to the cylindrical body, and
wherein a pivot hinge is integrally secured to an upper edge of the cylindrical body adjacent the opening and includes a pivot pin extending orthogonally upwardly thereof to pivotally mount the lid thereto, and the lid further including a projection diametrically opposed to the pivot pin and integrally secured to the lid and receivable within a semi-cylindrical recess formed within an upper edge of the cylindrical body diametrically opposed to the pivot hinge.

4,928,971
ALIGNMENT SYSTEM
Thomas D. Soles, Jr., 3412 Porter St., N. W., Washington, D.C. 20016
Filed Apr. 4, 1989, Ser. No. 332,977
Int. Cl.[5] A63B 69/36, 53/04
U.S. Cl. 273—164 6 Claims



1. An alignment system for a golf club to allow a player to establish alignment in a precise manner, said golf club having a ball striking face, a lower surface, and an upper surface parallel to said lower surface, said upper surface comprising:
(a) a first indicia line extending substantially across the length of the upper surface parallel to the ball striking face, but removed from said face;
(b) a second indicia line extending substantially across the width of the upper surface perpendicular to the ball striking face and intersecting said first indicia line;
(c) a conical depression formed at the intersection of said first and second indicia lines, said conical depression having an internal surface extending substantially from said upper surface to said lower surface and having an apex disposed substantially closer to said lower surface, said first and second indicia lines extending longitudinally to the apex along the internal surface of said conical depression;
(d) an indication of the proper alignment of the club occurring when said first and second indicia lines located on said internal surface form a straight right angled intersection at the apex when viewed by a player.

4,928,972
IRON CLUB HEAD FOR GOLF
Tatsuo Nakanishi; Toyohiko Tadokoro, and Masaki Fujimura, all of Hamamatsu, Japan, assignors to Yamaha Corporation, Japan
Continuation-in-part of Ser. No. 70,906, Jul. 8, 1987, abandoned. This application May 23, 1989, Ser. No. 355,665
Claims priority, application Japan, Jul. 9, 1986, 61-161663; Jul. 9, 1986, 61-161665
Int. Cl.[5] A63B 53/04
U.S. Cl. 273—78 12 Claims

1. An iron-type golf club head comprising, a main body member having a front side and a rear side, said main body member being made of a metal, said rear side including a recess, said front side including a wall section having an inner surface in communication with said recess and a shooting

surface remote from said inner surface, a fiber reinforcement member disposed in said recess adjacent said inner surface of said wall section, a back plate disposed in said recess adjacent and generally coextensive in area with said fiber reinforcement

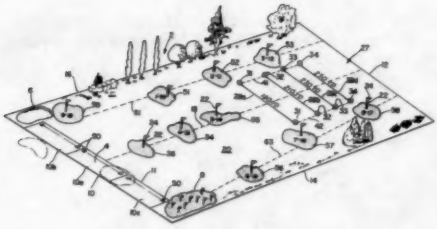
member and remote from said inner surface of said wall section, and support means for fixing said fiber reinforcement member and said back plate in said recess, said fiber reinforcement member and said back plate establishing a reinforcement for said shooting surface when said golf club head strikes a ball.

4,928,973

METHOD AND COURSE FOR PLAYING A GOLF-LIKE GAME

Ralph Perry, 5731 Pine Acres La., and Edgar N. Weaver, Jr., 2502 Stanley Ave., S.E., both of Roanoke, Va. 24014

Filed Sep. 16, 1987, Ser. No. 97,640
Int. Cl.[5] A63B *67/02*
U.S. Cl. 273—176 A **22 Claims**



1. A method of playing a golf-like game with a plurality of holes on a course having a fairway of predetermined length and width and a series of target greens, a single pitching green, and a teeing area separate from the fairway and from each other, the fairway including a plurality of yardage markers, and the target greens each corresponding to at least one hole of the game, said method comprising the steps of:

(a) a placing a first golf ball in a designated area of the teeing area and driving the ball up the fairway in the direction of a preselected one of the yardage markers;

(b) following step (a), placing a second golf ball in the designated area of the teeing area and hitting the second golf ball to one of the series of target greens corresponding to the hole being played;

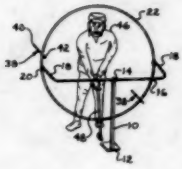
(c) following step (b), if the second golf ball fails to land on the target green, repeatedly placing an additional golf ball in the designated area of the teeing area and hitting the additional ball to the pitching green until the additional golf ball lands on the pitching green.

4,928,974

GOLF SWING TRAINER

Raymond J. VanKirk, 5370 Folks Rd., Horton, Mich. 49246

Filed Mar. 21, 1989, Ser. No. 326,734
Int. Cl.[5] A63B *69/36*
U.S. Cl. 273—186 R **8 Claims**



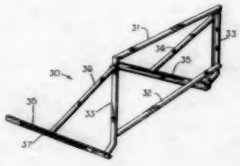
1. A golf swing trainer comprising, in combination, a vertically extending support, feeler support means mounted on said support having a configuration defining the desired path of movement of a golf club swing, and at least a pair of spaced feelers mounted upon said support means, each of said feelers comprising a lightweight elongated element having first and second ends, said elements each being cantilever mounted upon said support means remotely from said first ends, and said first ends being resiliently laterally deflectable whereby engagement of said element first ends by a swung golf club will cause the engaged ends to be momentarily deflected without damage to said elements, and said engagement will be sensed by the golfer, said elements being sufficiently spaced apart on said support means to indicate to the golfer departure of the golf club swing from said desired planar path of movement upon said elements being engaged.

4,928,975

GOLF PUTTING PRACTICE APPARATUS

Keith Skelley, and William G. Skelley, both of 115 Broadmeadow Cove, Roswell, Ga. 30075

Filed Jun. 12, 1989, Ser. No. 364,175
Int. Cl.[5] A63B *69/36*
U.S. Cl. 273—192 **5 Claims**



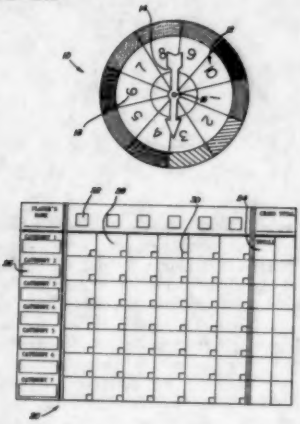
1. Apparatus for use in practicing golf strokes with a golf club of the type having a shaft extending between a handle and a head, and with the apparatus comprising guide means having a pair of parallel slide rails that provide guide surfaces for guiding a portion of the club shaft located adjacent to the club handle and a portion of the club shaft located adjacent to the club head along a common plane, and means for supporting said guide means guide surfaces above a golf ball playing surface with said common plane positionable at selected angles of incline with respect to the ball playing surface, said support means comprising a first pair of legs coplanar with said rails and to which said pair of slide rails are rigidly mounted and a second pair of legs pivotably mounted to said first pair of legs.

4,928,976

WORD QUESTION ASSOCIATION GAME

Barbara Vano, and Bruno Vano, both of 36324 Moravian, Fraser, Mich. 48026

Filed Jun. 16, 1989, Ser. No. 368,413
Int. Cl.[5] A63F 3/00
U.S. Cl. 273—240 3 Claims



1. A method for playing a word association game for at least two players, comprising:

(a) spinning a pointer rotatably attached to a multi-colored, pie sectioned spinner having each pie section a different color and having a numerical value associated with each color to randomly determine a starter, said starter being the player with the highest score on the spinner;

(b) selecting a word from a play word list and revealing that word to the other players, said starter selecting the word, and having the each player write that word on a game score sheet, said sheet having a first plurality of squares arranged in a row across the top of said sheet, each square having space for a single letter, said sheet further having a second plurality of squares arranged vertically in columns under each of said first plurality of squares and in rows in relation to each other horizontally, said second plurality of squares further having an area therein to write a partial score for the letter played, said game sheet further provided with a first plurality of boxes arranged in a column along one side of the sheet, said first boxes designated as category and arranged so that horizontally they form a row with the said second plurality of squares, said sheet further provided with a second plurality of boxes arranged in a column along the opposite side of said sheet, said second plurality of boxes arranged so that horizontally they form a row with the said second plurality of squares;

(c) having each player spin the spinner and select a category card based upon the color indicated by the random spin of the spinner, each player proceeding successively in this manner until all the categories are selected, each player writing the categories into the said first plurality of boxes on the game sheet;

(d) filling the second plurality of squares with words associated with the category corresponding to that row on the game sheet and beginning with the letter indicated in the square of the first plurality of squares which corresponds to the column in which the second square is situated;

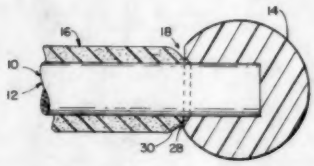
(e) stopping the game at some predetermined time and determining the score each player has earned by totalling the points earned for the words each player has selected in the second plurality of squares.

4,928,977

THROWN AND BOUNCED TOY HAVING A HAND GRIP TERMINATING IN HIGH BOUNCE BALLS

Timothy D. Chambers, P.O. Box 668, Gold Bar, Wash. 98251

Filed Jan. 9, 1989, Ser. No. 295,431
Int. Cl.[5] A63B 65/00
U.S. Cl. 273—428 7 Claims



1. A thrown, caught, and bounced toy, comprising:

(a) a cylindrical rod having a length to be conveniently gripped by at least one hand of a person, and to extend into respective interiors of specially formed high bounce balls; and

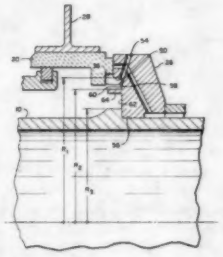
(b) specially formed high bounce balls having respective interiors to fit over the respective ends of the cylindrical rod, wherein each interior of each specially formed high bounce ball has an overall entry profile, which is inclusive of both a radial circumferential surface and an interior inwardly tapered surface, thereby providing a clearance into which respective impact distorted portions of the high bounce balls freely move, to avoid their otherwise fatigue stressing, and thereby prolong their effective operating game life, as this toy is effectively used upon bouncing off of hard surfaces.

4,928,978

ROTATING SHAFT SEAL

Harold K. Shaffer, Tolland, and Roger M. Barnsby, Manchester, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Apr. 7, 1988, Ser. No. 178,694
Int. Cl.[5] F16J 15/16, 15/42
U.S. Cl. 277—25 5 Claims



1. A rotating shaft seal arrangement comprising:

a high speed rotating shaft;

a circular seal ring rotating with said shaft and having a radial seal face near its outer periphery, said seal ring also including a radial support portion supporting said seal face and having a radial exposed face radially inward of said seal face;

a stationary fixed seal element having a radial seal surface, in interfacial sealing contact with said seal face;

means for supplying oil to the interface between said seal face and said seal surface;

said seal element and said seal ring shaped to form an inwardly facing circumferential annulus at the inner edge of said seal surface and said seal face;

said seal ring having at least one hole through said seal ring from said annulus to the outer periphery of said seal ring; and

an axially extending flange integral with said seal ring dividing said radially exposed face into inner and outer annular portions.

4,928,979

SEALING APPARATUS

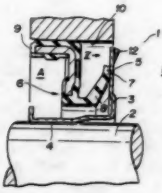
Shinji Nagasawa, Fukushima, Japan, assignor to NOK Corporation, Tokyo, Japan

Filed Aug. 30, 1988, Ser. No. 238,562

Claims priority, application Japan, May 30, 1988, 63-71460[U]

Int. Cl.[5] F16J *15/32, 15/34, 15/40*

U.S. Cl. 277—38 **5 Claims**



1. A sealing apparatus comprising:

a housing;

a sealing apparatus main body mounted on said housing and provided with a sealing lip;

a rotary body mounted on a rotary shaft of a member with which said apparatus is combined, said rotary body extending in a radial direction of said rotary shaft and having a side surface which is in sliding contact with said sealing lip; and

a bent portion formed by bending a notch portion formed in an outer edge portion of a side surface of said rotary body at a portion circumferentially outward of said contacting of said sealing lip with said side surface of the rotary body.

4,928,980

SEALING COVER, PARTICULARLY FOR MOTOR VEHICLE CRANKCASES AND GEAR BOXES

Hans Deuring, Im Eulenflug 29, D-5093 Burscheid, Fed. Rep. of Germany

Continuation of Ser. No. 103,750, Oct. 2, 1987, abandoned. This application Apr. 5, 1989, Ser. No. 333,694

Claims priority, application Fed. Rep. of Germany, Oct. 11, 1986, 3634735

Int. Cl.[5] F16J *15/10, 15/32*

U.S. Cl. 277—153 **20 Claims**

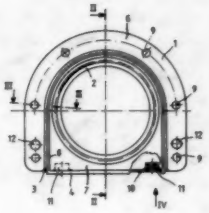
1. In a sealing cover for a housing; provided with a hole having a center axis, for passage of a shaft which extends through the cover along this axis, the cover comprising a metal cover body having a substantially arcuate-shaped cover flange face which extends radially outward with respect to said axis, said cover flange face having an inner edge; a dynamically acting seal for the shaft, the dynamically acting seal comprising at least one elastic sealing lip which is vulcanized to the body; a statically acting seal means, including first and second elastic sealing strips projecting in an axial direction substantially parallel to said axis of said hole and vulcanized to said body, for sealing the cover flange face, the improvement wherein:

said body is composed of a profiled, drawn sheet-metal body including:

a first axially extending face having an axially outward end connected to the inner edge of said cover flange face;

a first radially inwardly extending face surrounding said hole and having an arcuate first face portion and a second face portion connecting opposite ends of said first face portion, said first portion having a radially outward end connected to an axially inward end of said first axially extending face, so that said first face portion of said first radially inwardly extending face is axially offset relative to said cover flange face;

a second axially extending face having an axially outward end connected to a radially inward end of said first face portion of said first radially extending face; and



a second radially inwardly extending face having a radially outward end connected to an axially inward end of said second axially extending face so that said first face portion of said first radially inwardly extending face is disposed radially inward of said cover flange face and radially outward of said second radially inwardly extending face; and wherein said cover flange face includes means for connecting said body to the housing, said first face portion of said first radially extending face receives said first sealing strip and said second face portion of said first radially extending face receives said second sealing strip such that said first and second sealing strips are formed in one plane, and said sealing lip is vulcanized to a radially inward end of said second radially extending face.

4,928,981

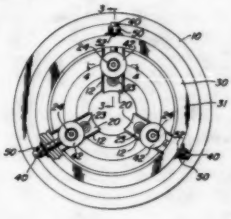
JAW LOCKING MEANS FOR CHUCKS

Lawrence H. Brown, Ambler, Pa., assignor to Accu-Ring Jaw Systems, Inc., Ambler, Pa.

Filed Feb. 10, 1989, Ser. No. 308,559

Int. Cl.[5] B23B *31/10*

U.S. Cl. 279—1 SJ **12 Claims**



1. For use with a chuck, such as a lathe chuck or the like, having a plurality of hard jaws guided for sliding movement toward and away from a chuck center and radially to the chuck axis by the jaw setting means of the lathe or the like, and a soft jaw secured on top of each of said hard jaws for conjoint movement therewith as a unit radially to the chuck axis,

jaw positioning means for locking each soft jaw at a desired

position for the machining of the workpiece engaging surface thereof comprising:

a ring means adapted to be arranged with portions in the proximity of the soft jaws, said ring means having radially extending holes,

a plurality of studs, one stud associated with each soft jaw, means for securing each of said studs to an associated soft jaw and the hard jaw therebeneath with each stud extending through a radial hole in said ring means to provide a threaded portion projecting radially outwardly from the outer surface of said ring means and with each stud extending on a radial axis parallel to and spaced apart from the axis of radial movement of the associated soft jaw,

and a plurality of nut means, one of said nut means being threadedly engaged on each of said studs at the outwardly projecting portion thereof,

said nut means being adjustable radially along the threaded portion of said studs to a position to limit the radial inward movement of said soft jaws to lock said soft jaws at a desired position for the machining of said workpiece engaging surfaces of said soft jaws.

4,928,982

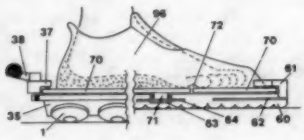
CONVERTIBLE RUNNING SHOES/ROLLER SKATES

Kenneth C. Logan, P.O. Box 48168 Bentall Centre, Vancouver, B.C., Canada (V7X 1N8)

Filed Mar. 18, 1988, Ser. No. 170,002

Int. Cl.[5] A63C *17/14*

U.S. Cl. 280—11.22 **2 Claims**



1. A convertible roller skate comprising: footwear including a sole plate having a heel portion, a toe portion hinged to the heel portion for permitting normal flexure of the sole plate during walking or running by a user, and a pivot pin extending downwardly from said heel portion at a central portion of said sole plate;

a disk plate including a toe retention channel for receiving the toe portion of said sole plate, a pivot pin seat for rotatably receiving said pivot pin, means for removably locking said sole plate to said disk plate at selected angles of rotation about said pivot pin, and a plurality of truncated conical disks rotatably attached to the lower surface of said disk plate along two longitudinally extending rows, each row of disks comprising a plurality of front disks having an axis of rotation extending inwardly and downwardly with respect to a vertical plane intersecting the center line of said disk plate and a plurality of rear disks having an axis of rotation extending inwardly and upwardly with respect to said vertical plane; and

a flexible tread plate including means for removably securing said tread plate to said sole plate, wherein said tread plate may be secured to the sole plate of said footwear for use as a conventional shoe or said disk plate may be secured to the sole plate of said footwear for use as a roller skate.

4,928,983

SNOW GLIDER

Freimut Maass, Kreuznacher Str. 5, D-7000 Stuttgart 50, Fed. Rep. of Germany

PCT No. PCT/DE87/00023, § 371 Date Nov. 23, 1987, § 102(e) Date Nov. 23, 1987, PCT Pub. No. WO87/04397, PCT Pub. Date Jul. 30, 1987

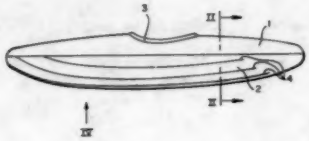
Continuation of Ser. No. 116,946, Nov. 23, 1987, abandoned.

This PCT application Jan. 21, 1987, Ser. No. 315,186

Claims priority, application Fed. Rep. of Germany, Jan. 21, 1986, 3601607; Feb. 8, 1986, 3604017

Int. Cl.[5] B62B *13/06*

U.S. Cl. 280—18 **13 Claims**



1. A snow glider comprising a body having front and aft ends to accommodate at least one person, said body having a vertical transverse cross section of an ellipsoid configuration and having a longitudinal and transverse convex bottom bottom provided with runners extending therefrom, said runners having a longitudinal extent and being disposed on said bottom in parallel spaced relation from said front end to a point removed from said aft end thereof, whereby said person can shift his weight rearwardly to lift said runners from the snow for steering.

4,928,984

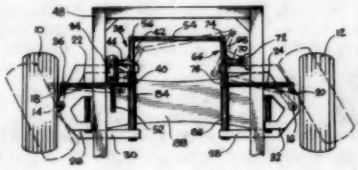
STEERING SYSTEM FOR TRACKING OF WHEELS

John K. Bauer, 510 Lenox Ave., Miami Beach, Fla. 33139

Filed Jun. 9, 1989, Ser. No. 363,680

Int. Cl.[5] B62D *7/00*

U.S. Cl. 280—95.1 **17 Claims**



1. A steering system for a vehicle having a frame and a pair of axially aligned steerable wheels supported on laterally opposed sides of the frame comprising,

first and second linkage assemblies for exerting a turning force on steerable wheels of a vehicle, each linkage assembly having an inboard end and an outboard end and being substantially parallel to the other during straight-line driving, said outboard end of the first linkage assembly coupled to a first steerable wheel and said outboard end of said second linkage assembly coupled to a second steerable wheel,

a first track-inducing member having horizontally extending motion transfer and pivot extension segments, said motion transfer segment having spaced apart first and second pivot couplings, said first pivot coupling being attached to said inboard end of the first linkage assembly, said pivot extension segment extending from between said pivot couplings and attaching to said vehicle for rotation about

a first vertical axis spaced apart from said motion transfer segment,

a third linkage assembly having opposed extremities, with one extremity attached to said second pivot coupling,

a second track-inducing member having horizontally extending motion transfer and pivot extension segments, said motion transfer segment having spaced apart third and fourth pivot couplings, said third pivot coupling being attached to the extremity of said third linkage assembly opposite said second pivot coupling, said fourth pivot coupling being attached to the inboard end of the second linkage assembly, said pivot extension segment extending from between said third and fourth pivot couplings and attached to said vehicle for rotation about a second vertical pivot axis spaced apart from said first, and

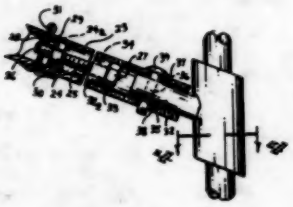
manually operated steering means for rotating said first track-inducing member about said first vertical axis, said rotation of the first track-inducing member causing rotation of said second track-inducing member via said third linkage assembly, said track inducing members providing dissimilar lateral displacements of said first and second linkage assemblies.

4,928,985

BICYCLE BUGGY APPARATUS

Bobby R. Nowlin, 5753 Beth Rd., Huber Heights, Ohio 45424

Filed Feb. 16, 1989, Ser. No. 310,891
Int. Cl.[5] B62K *27/00, 27/12*
U.S. Cl. 280—204 **5 Claims**



1. A bicycle buggy apparatus in combination with a bicycle, said bicycle including a framework and a bicycle seat with a seat stud extending downwardly of the bicycle seat and receivable within the framework, and the bicycle buggy apparatus comprising,

a buggy including a seat overlying a floor with a plurality of wheels positioned under said floor proximate a rear end of said floor,

and

an elongate mount extending along and integrally secured to a forward edge of said floor,

and

a coupling shaft fixedly secured to said mount,

and

a sleeve member mounted to said seat stud,

and

connecting means joining said sleeve member to said coupling shaft for selectively joining said coupling shaft to said sleeve member,

and

wherein said coupling shaft is of a generally "S" shaped configuration extending orthogonally outwardly of said mount and fixedly secured to said mount at a lower end and terminating at its other end in elevation above the lower end at and upper end, and said upper end including joining means securing said upper end to said connecting means,

and

wherein said joining means includes a securement member fixedly secured interiorly of said upper end and spaced from said upper end, and said securement member including a threaded aperture axially aligned with said upper end, and a threaded member receivable within the threaded aperture of the securement member,

and

wherein the threaded member includes an elongate threaded shank receivably threaded through the threaded aperture and an enlarged head of a diameter greater than that of the threaded shank, and the threaded shank formed with a shank aperture formed orthogonally through the threaded shank proximate a distal end thereof,

and

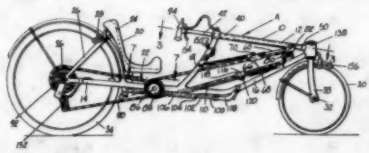
wherein the upper end of the coupling shaft includes an upper and lower coupling shaft aperture diametrically opposed and alignable with said shank aperture, and a first locking pin extending through said upper and lower coupling shaft apertures and simultaneously through said shank aperture to secure said threaded shank relative to said upper end.

4,928,986

ARM AND LEG POWERED CYCLE

Paul R. Carpenter, Lakewood, Colo., assignor to P. D. Enterprises, Inc., Lakewood, Colo.

Filed May 6, 1988, Ser. No. 190,927
Int. Cl.[5] B62M *1/12*
U.S. Cl. 280—234 **9 Claims**



1. An arm and leg-powered cycle apparatus, comprising:

a chassis having a forward end and a rear end and having a seat for an operator;

an upper drive member on said chassis forward of said seat, said upper drive member linearly reciprocating through a drive stroke and a return stroks;

a lower drive member on said chassis below said upper drive member and forward of said seat, said lower drive member linearly reciprocating through a drive stroke and a return stroke;

a forward wheel and a rear wheel, each wheel rotatably mounted on said chassis;

gear means connected to said rear wheel for receiving power to drive said rear wheel;

drive gear means on said chassis spaced from and forward of said rear wheel gear means;

an endless transmission chain slung between said rear wheel gear means and said drive gear means for transmitting motion from said drive gear member to said rear wheel;

a freewheeling sprocket on said chassis forward of said drive gear means;

an endless drive chain slung between said sprocket and said drive gear means; and

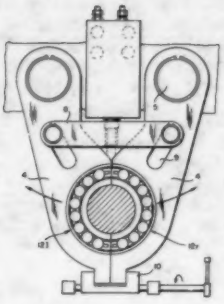
one-way chain engaging means connected to said drive members for transmitting the linear motion of said upper and lower drive strokes to said drive chain to drive said rear wheel.

4,928,987

FIFTH WHEEL COUPLING

Walter Hunger, Otto-Nagler-Strasse 13, 87 Wuerzburg, Fed. Rep. of Germany

Filed Feb. 13, 1989, Ser. No. 309,132
Int. Cl.[5] B62D *53/08, 53/12*
U.S. Cl. 280—435 **11 Claims**



1. A fifth wheel coupling for the connection of a semitrailer to a tractor unit, comprising:

a pair of symmetrical, swivel-articulated closing jaws, said jaws having a mating pair of semicircular recesses for grasping a king pin of the semitrailer;

a split bearing positioned in said recesses of the closing jaws, said bearing comprising an outer bearing half fixed in each closing jaw and a pair of inner bearing halves rotatable with respect to the outer bearing halves; and

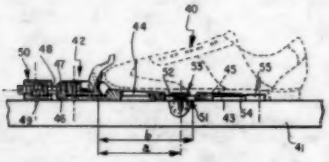
means for returning each inner bearing half to an initial position aligned with its respective outer bearing half.

4,928,988

SAFETY BINDING FOR A SKI

Jean Hue, Annecy, France, assignor to Salomon S.A., Annecy Cedex, France

Division of Ser. No. 816,962, Jan. 8, 1986, abandoned, which is a continuation of Ser. No. 482,370, Apr. 5, 1983, abandoned. This application Feb. 24, 1987, Ser. No. 17,638
Claims priority, application France, Apr. 8, 1982, 82 06434
The portion of the term of this patent subsequent to Jun. 30, 2004, has been disclaimed.
Int. Cl.[5] A63C *9/10*
U.S. Cl. 280—607 **13 Claims**



1. An apparatus for connecting a ski boot having a sole and a heel to a ski, wherein said boot is adapted to receive a foot having a metatarsal region associated therewith, wherein said apparatus comprises a binding comprising:

a plate adapted to receive the sole of said boot;

means attached to said plate at a first end thereof for attaching the front end of said boot to said ski so as to permit said heel of said boot to be lifted off said ski in normal use;

means for permitting said plate with said boot received thereon to pivot about a substantially vertical pivot axis, wherein said vertical pivot axis extends through said metatarsal region of said foot when said foot is received in said boot held by said apparatus; and

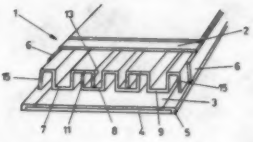
wherein said plate comprises a second end adapted to be operatively positioned adjacent said heel of said ski boot and wherein said heel of said ski boot is adapted to extend beyond said second end when connected to said ski by means of said apparatus.

4,928,989

SKI HAVING A CORE COMPRISING ANGLED PROFILES

Bernhard Mayr, Hard, and Heinz Lampl, Hohenems, both of Austria, assignors to Head Sportgeraete Gesellschaft m.b.H. & Co. OHG, Kennelbach, Austria

Filed Dec. 5, 1988, Ser. No. 279,682
Claims priority, application Austria, Dec. 9, 1987, 3239/87
Int. Cl.[5] A63C *5/12*
U.S. Cl. 280—610 **10 Claims**



1. A ski comprising:

a running surface extending in a longitudinal direction;

a top surface extending parallel to and spaced from the running surface;

a plurality of side surfaces extending between the running surface and the top surface;

a core defined by the running surface, the top surface and the side surfaces;

a plurality of angled profiles formed inside the core, each angled profile comprising a plurality of longitudinally extending and laterally spaced bases extending substantially parallel to the running surface, said bases including upper base portions adjacent said top surface and lower base portions adjacent said running surface, said upper and lower base portions having longitudinally extending side edges a plurality of inner legs, and a plurality of outer legs adjacent the side surfaces, each of the inner legs extending from the longitudinal side edges of the respective base upper and lower portions in substantially normal relationship thereto and each of said outer legs extending from the outer side edge of a respective outermost upper base portion, said profiles defining cavities between adjacent legs, characterized in that at least two of the angled profiles are at least partially enclosed in each other in overlapping relationship such that the height of one of the inner legs is decreased by an amount corresponding to the height of the bases of each of the overlapping angled profiles.

4,928,990

FREELY SLIDABLE ANTIFRICTION PLATE WHICH AUTOMATICALLY RECENTERS FOR SAFETY BINDING

Pierre Rullier, Annecy, France, assignor to Salomon S.A., Annecy Cedex, France

Filed Jan. 28, 1988, Ser. No. 149,665
Claims priority, application France, Jan. 28, 1987, 87 01287
Int. Cl.[5] A63C *9/081, 9/085*
U.S. Cl. 280—625 **25 Claims**

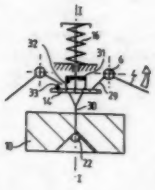
18. A safety binding comprising:

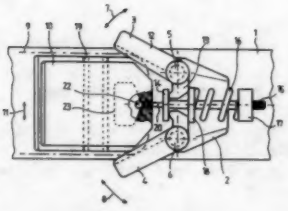
(a) a first wing and a second wing for retaining one end of a boot on a ski, said wings being independently laterally pivotable about respective first and second axes;

(b) means for supporting said boot on said ski, said supporting means being slidable with respect to said ski to and from a centered position relative to said ski;

(c) means for biasing said wings towards a retention position for retaining said one end of said boot on said ski, and for biasing said supporting means toward said centered position;

(d) a linkage assembly comprising a longitudinally movable member and an abutment, said linkage assembly operatively associating said supporting means with said wings for permitting said supporting means to move laterally free from the effect of said biasing means in response to lateral pivoting of either of said wings, said abutment being movable independently of said longitudinally mov-





able member, wherein respective portions of each of said wings contact said abutment, and wherein said biasing means act through said abutment for biasing said wings in said retention position; and

(e) means for guiding said longitudinally movable member for movement between a first extreme position, in contact with said abutment, and a second extreme position, displaced from said abutment, wherein, in said first extreme position, said supporting means is in said centered position and wherein, in said second extreme position, said supporting means is permitted to slide laterally relative to said ski, and wherein upon pivoting of either of said wings, said longitudinally movable member is movable freed from the effect of said biasing means between said first and second extreme positions.

4,928,991

ASPIRATING INFLATOR ASSEMBLY

William F. Thorn, Redmond, Wash., assignor to Automotive Systems Laboratory, Inc., Farmington Hills, Mich.

Filed Mar. 8, 1989, Ser. No. 320,396

Int. Cl.[5] B60R *21/16, 21/26*

U.S. Cl. 280—738 **10 Claims**

1. An aspirating inflator assembly for a vehicle occupant restraint system comprising,

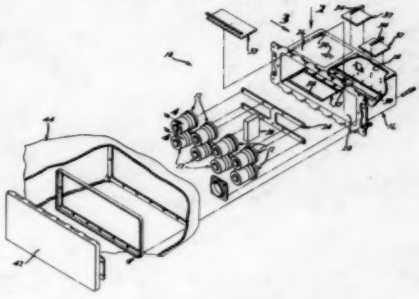
a housing defined by spaced sidewalls, a back wall and an openable front panel,

an airbag attached to and stored internally of said housing,

a plurality of gas generators supported adjacent to the back wall of said housing,

a plurality of apertures in at least one sidewall of said housing, and

a valve on said housing for admitting ambient air thereinto



through said apertures but precluding exhaust of air outwardly of said housing, the frontal panel on said housing being openable upon energization of said gas generator to facilitate deployment of said airbag.

4,928,992

SEAT BELT BUCKLE ARRANGEMENT

Peter Qvint, Vargarda; Tommy Andersson, Alingsas, and Lennart Eksell, Boras, all of Sweden, assignors to General Engineering (Netherlands) B.V., Utrecht, Netherlands

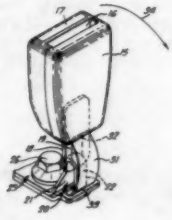
PCT No. PCT/SE88/00084, § 371 Date Oct. 26, 1988, § 102(e) Date Oct. 26, 1988, PCT Pub. No. WO88/06543, PCT Pub. Date Sep. 7, 1988

PCT Filed Feb. 26, 1988, Ser. No. 265,139

Claims priority, application United Kingdom, Feb. 26, 1987, 8704496

Int. Cl.[5] B60R *22/22*

U.S. Cl. 280—801 **13 Claims**



1. A safety belt arrangement comprising:

a buckle having an open mouth for receiving a tongue, said buckle comprising means for retaining said tongue therein;

a flexible connection means for connecting said buckle to an anchoring point on a motor vehicle, said flexible connection means comprising two or more interconnected rigid links for preventing said buckle from moving more than a predetermined distance away from said anchoring point and for allowing said buckle to be moved closer than the predetermined distance towards said anchoring point and;

a resilient member connected to said anchoring point and said buckle for holding said buckle in a position in which the open mouth of the buckle is presented for receiving said tongue.

4,928,993

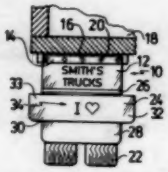
SPLASH GUARD

Darma L. Appavoo, P.O. Box 98, Kerrobert, Saskatchewan, Canada (S0L 1R0)

Filed Jun. 26, 1989, Ser. No. 371,197

Int. Cl.[5] G09F *21/00*

U.S. Cl. 280—851 **4 Claims**



1. A splash guard for a vehicle comprising:

a main panel adapted to be mounted on the vehicle so as to depend therefrom, the main panel having a predetermined width and a predetermined height;

a secondary panel pivotally mounted on a back face of the main panel to pivot freely about a lateral hinge line and normally depending from the hinge line with a front face of the secondary panel confronting and covering a portion of the back face of the main panel, the secondary panel having a width greater than the predetermined width of the main panel and a height less than the predetermined height of the main panel;

first indicia marked on a back face of the secondary panel;

second indicia marked on that portion of the back face of the main panel that is normally covered by the secondary panel;

whereby air passing by the main panel in a front to back direction will impinge upon exposed portions of the secondary panel and pivot the secondary panel upwards to the rear, thus exposing the secondary indicia to view.

4,928,994

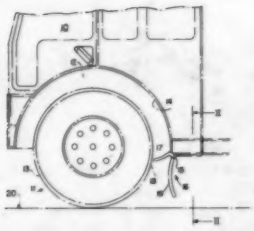
MOTOR VEHICLE WATER AND MUD SPLASH GUARD

Fritz Buchner, E 7, D-6800 Mannheim, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 109,926, Oct. 19, 1987, abandoned. This application Dec. 30, 1988, Ser. No. 292,177

Int. Cl.[5] B60R *27/00*; B62B *9/16*

U.S. Cl. 280—851 **3 Claims**



1. A splash guard for preventing or reducing throwing of water bursts from wheel boxes of a power driven vehicle during driving on wet roads, comprising

a two-wing splash guard arranged to extend substantially over the entire width of a wheel box substantially parallel to the wheel axis of the vehicle at its rear lower end as considered in a traveling direction,

each of said wings being adjustably mounted about a common support axis by means of threaded bolt and nut means,

one wing extending from said axis in a predetermined mounted position from the wheel box toward a road surface, and another wing in a predetermined mounted position toward a running surface of a wheel so as to form a guarding part therefor.

4,928,995

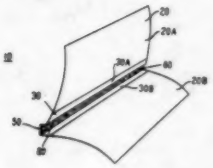
BINDABLE COVER FOLDERS

John H. Pickering, Wayland; Sushil K. Bhatia, Framingham; Mihira K. Rath, Milford, all of Mass., and Roger N. Chevrette, Woonsocket, R.I., assignors to Dennison Manufacturing Company, Framingham, Mass.

Continuation-in-part of Ser. No. 239,455, Sep. 1, 1988. This application Mar. 28, 1989, Ser. No. 329,724

Int. Cl.[5] B42D *3/00, 17/00*; B42C *9/00*; B42B *3/04*

U.S. Cl. 281—29 **8 Claims**



1. A folder for permanently binding a stack of paper sheets comprising:

a binder spline comprising an elongated rigid member having a channel running along its length,

said elongated rigid member having an aperture through a side thereof,

a cover sheet affixed to the elongated rigid member,

and a closed squeezable elongated member containing a book binding adhesive therein, said squeezable member having one end thereof passing through said aperture, and said squeezable member contained substantially within and along the length of said channel,

so that as said squeezable member is pulled out of said channel through said aperture the squeezable member can rupture thereby releasing said adhesive into the channel.

4,928,996

BOOKLET WITH PHOTOGRAPH

Yuji Oshikoshi; Yoshimi Suganuma, both of Tokyo; Hiroshi Hara, Kanagawa; Kazuo Shiota, Kanagawa; Nobumitsu Takehara, Kanagawa, and Kiichiro Sakamoto, Kanagawa, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 24, 1988, Ser. No. 261,195

Claims priority, application Japan, Oct. 23, 1987, 62-267848; Mar. 4, 1988, 63-51199; Mar. 4, 1988, 63-51200

Int. Cl.[5] B42D *15/00*

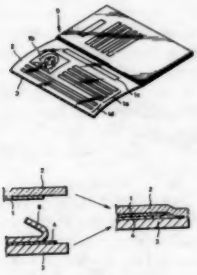
U.S. Cl. 283—109 **17 Claims**

1. A booklet for identifying a holder thereof, said booklet being provided with a picture of the face and personal data of said holder, which comprises:

a transparent sheet bound in said booklet;

an image receiving layer formed on one surface of said transparent sheet, said image receiving layer including a composite image of said picture and said personal data; and

a supporting sheet bound in said booklet separately from and next to said transparent sheet, said supporting sheet being



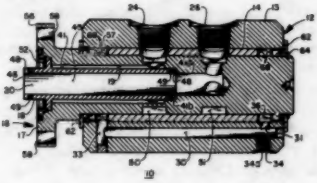
adhered to said transparent sheet to sandwich said image receiving layer therebetween.

4,928,997

ROTATING UNION WITH CARBON GRAPHITE LABYRINTHINE SEAL

Delbert C. Reisener, Glenview, and Dennis G. Pearson, Lake Zurich, both of Ill., assignors to Deublin Company, Northbrook, Ill.

Filed Mar. 13, 1989, Ser. No. 322,657
Int. Cl.[5] F16L *39/04*
U.S. Cl. 285—13 **12 Claims**



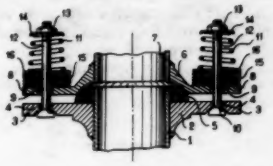
1. In a multiple passage rotating union including a housing having an axial bore therethrough and rotor means rotatably supported within the axial bore of the housing, the housing defining a plurality of fluid inlet ports, the rotor means defining a plurality of fluid outlet ports, the rotor means having a plurality of fluid passageways communicating the fluid outlet ports with the fluid inlet ports, the improvement comprising: an elongated generally cylindrical one-piece sleeve member of a hard, rigid anti-friction material, said sleeve member being assembled with said housing, located in the axial bore of the housing, interposed between an inner surface of the housing and the outer surface of the rotor means, said sleeve member providing a bearing surface for the rotor means, said sleeve member extending along the portion of the housing which includes all of the inlet ports, said sleeve member having a plurality of apertures in registry with the inlet ports whereby all of the inlet ports are communicated with the fluid passageways through said sleeve member, and the outer diameter of said sleeve member being greater than the inner diameter of the bore through the housing prior to assembly therewith, and said housing being expanded by heating to increase the inner diameter of its bore to facilitate location of said sleeve therewithin, thereby providing an interference fit between said sleeve member and the housing upon subsequent cooling of said housing with said sleeve member assembled together with the housing, said sleeve member providing a seal between the housing and the rotor means for adjacent inlet ports.

4,928,998

FLEXIBLE EXHAUST COUPLING

Louis Brandener, Poissy, France, assignor to Societe Jacques DuBois, Barentin, France

Filed Apr. 4, 1989, Ser. No. 332,736
Claims priority, application France, Apr. 12, 1988, 8804813
Int. Cl.[5] F16L *55/04*
U.S. Cl. 285—49 **9 Claims**



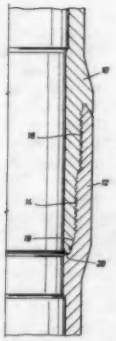
1. A flexible exhaust coupling comprising a first length of pipe terminating in a convex spherical bearing part, a first connecting flange associated with the first length of pipe, a second length of pipe terminating in a concave spherical bearing part which faces the convex spherical bearing part of the first length of pipe, a second connecting flange associated with the second length of pipe, bolt means having ends for holding said bearing parts in sealing engagement with said bolt means extending through openings in said connecting flanges, helical springs surrounding stems of bolt means, said helical springs having one end facing an end of said bolt means and a second end facing one of said connecting flanges, and at least one vibration damping annular pad surrounding the stem of each bolt means and pressed between one end of the corresponding helical spring and an adjacent portion of said coupling.

4,928,999

ELASTOMERIC GUARD SEAL FOR TUBULAR CONNECTIONS

L. Steven Landriault, Jersey Village; Donald J. Ortloff, and Charles A. Bollfrass, both of Houston, all of Tex., assignors to Hydril Company, Houston, Tex.

Filed Apr. 30, 1984, Ser. No. 605,378
Int. Cl.[5] F16L *15/04*
U.S. Cl. 285—113 **17 Claims**



1. In combination with a tubular connection including a pin end having
at least one thread set, and
a conical metal sealing surface adjacent said thread set, and
an accommodating box end having

at least one box end thread set for making up the connection with said pin end thread set, and

a conical metal sealing surface for making a metal-to-metal seal with said pin end metal sealing surface,

said sealing improvement comprising

said pin end having a circumferential groove forward of said pin end metal sealing surface, tightening of the metal-to-metal seal after surface contact causing wedge separation of said pin end and box end forward of the pin end metal sealing surface, and

a compressible elastomeric sealing ring located in said groove and extending radially outwardly therefrom prior to connection makeup,

whereby during makeup said elastomeric sealing ring extrudes in the direction of said metal-to-metal seal to form a compound wedge seal therewith in front thereof against pressures from within.

4,929,000

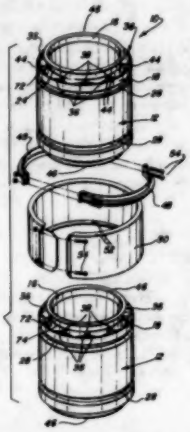
MULTIPLE WALLED CHIMNEY

James W. Annestedt, Sr., Memphis, Tenn., assignor to American Metal Products Company, Los Angeles, Calif.

Filed Dec. 2, 1988, Ser. No. 279,379

Int. Cl.[5] F16L *39/00*

U.S. Cl. 285—133.1 **25 Claims**



24. A multiple walled metal chimney comprising:

at least two chimney sections having a cylindrical inner wall member with a radially extending flange at each end, a cylindrical outer wall member in concentric spaced-apart relationship to said inner wall member, said outer wall member having a diameter greater than said inner wall member to form an annulus between said wall m embers, and a pair of corrugated spacer rings positionally captured within said annulus between said wall members proximate the ends of said chimney section, said wall members including annular shoulders extending into said annulus to prevent longitudinal movement of said spacer rings, said shoulders engaging said spacer rings;

said spacer rings including a plurality of corrugations and overlapping ends which form an expansible seam, said corrugations separated by planar segments which engage said inner wall member and include a pair of side wall segments extending perpendicular to said wall members, an intermediate segment which engages said outer wall member, and a pair of connecting segments formed at an angle to said intermediate segments and extending between said intermediate segment and said side wall segments;

an inner clamp means extending around adjoining end flanges of adjacent chimney sections to joint one chimney section with another chimney section in axial alignment, said clamp means including means for securing said inner clamp means; and

an outer clamp means extending around said outer wall members of adjacent chimney sections for closing the gap between adjacent outer wall members, said outer clamp means including flanges which are received in annular grooves formed in said outer wall members to facilitate attachment of said outer clamp means, said annular grooves corresponding to said annular shoulders of said outer wall members.

4,929,001

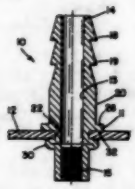
TUBULAR CONNECTOR

Ronald W. Phillips, II, Doylestown, Pa., assignor to The B.F. Goodrich Company, Akron, Ohio

Continuation-in-part of Ser. No. 360,688, Jun. 2, 1989, abandoned. This application Aug. 3, 1989, Ser. No. 388,883

Int. Cl.[5] F16L *3/04*

U.S. Cl. 285—158 **13 Claims**



1. A tubular connector for a fluid line (for connection to a thin walled member), said connector consisting of a longitudinally extending tubular member, said member having an annular flange along the intermediate external portion of said tubular member, said flange having an annular face, a central passageway extending longitudinally from one end of said connector to the other end of said connector, the portion of said passageway extending from said flange to said one end of said tubular member having a smooth walled portion and a threaded portion, said smooth walled portion lying closer to said flange than said thread portion, said threaded portion lying adjacent to said one end, the wall thickness of said smooth walled portion that lies between said flange and said threaded portion of said tubular member being thinner in cross-section than said threaded portion to facilitate upsetting of said thin smooth walled portion, and the external end portion of said tubular member lying adjacent to the other end of said tubular member having a plurality of axially spaced circumferentially extending barbs to facilitate the locking onto a hose.

4,929,002

DEVICE FOR COUPLING A HOSE TO A PIPE

Heinz Sauer, Ronneburg, Fed. Rep. of Germany, assignor to Rasmussen GmbH, Maintal, Fed. Rep. of Germany

Filed Apr. 11, 1989, Ser. No. 336,661

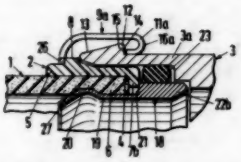
Claims priority, application Fed. Rep. of Germany, Apr. 20, 1988, 3813192

Int. Cl.[5] F16L *39/02*

U.S. Cl. 285—319 **26 Claims**

1. A device for joining a first conduit having a collar to a second conduit having a peripheral wall of predetermined thickness, particularly for joining a pipe and a hose, comprising a tubular coupling element having a first end receivable in the first conduit and a second end which is axially spaced from said first end, said coupling element including a plurality of hook-like members engageable with the collar on the first conduit, and said coupling element being designed to receive the second conduit via said second end and further including an abutment for the second conduit; a tubular retaining element having a

first section receivable in said coupling element so as to define therewith an annular space designed to accommodate the wall of the second conduit such that the wall forms a seal with both said coupling element and said retaining element, said retaining element further having a second section designed to project outward from the annular space into the first conduit, and to define an annular gap with the latter, when said first section is received in said coupling element, said second section and said coupling element being provided with complementary surface



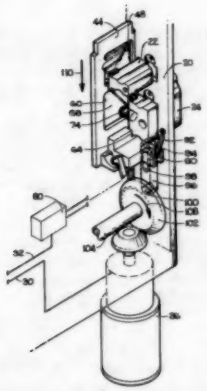
portions which are arranged to abut one another when said first section is received in said coupling element; and an annular sealing element for sealing the gap between said second section and the first conduit, said sealing element being designed to surround and form a seal with said second section, and said sealing element being deformable and having a predetermined width in undeformed condition thereof as considered axially of said coupling element and said second section, said second section having an axial length at least equal to said predetermined width.

4,929,003

MOTORIZED LOCKING MECHANISM FOR A DOOR

Lloyd T. McConnell, Duncanville, Tex., assignor to Adtec Incorporated, San Antonio, Tex.

Filed Oct. 7, 1988, Ser. No. 255,017
Int. Cl.[5] E05C *3/06*
U.S. Cl. 292—144 **20 Claims**



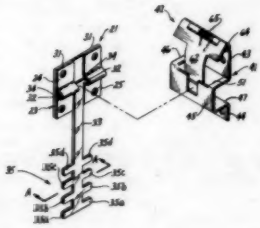
1. A mechanism for locking a door in a closed relationship with a doorjamb which comprises:
- a base plate;
- a bolt slideably mounted on said base plate for movement with respect thereto between a locked position wherein said bolt holds the door and doorjamb in the closed relationship and an unlocked position;
- a cam plate operatively engaged with said bolt and slideably mounted on said base plate for movement on said base between a first position wherein said cam plate holds said bolt in said locked position, a second position wherein said cam plate holds said bolt in said unlocked position and a third position wherein said cam plate allows said bolt to move between said locked position and said unlocked position;
- means for moving said cam plate;
- a latch operatively engaged with said cam plate and slideably mounted on said base plate for movement with respect thereto between a forward position and a retracted position; and
- means for urging said latch toward said forward position to hold said cam plate in said third position while the door is open.

4,929,004

VEHICLE DOOR LATCH

Patrick H. Chidester, 11828 Old River School Rd. #E, Downey, Calif. 90241

Filed Mar. 27, 1989, Ser. No. 329,319
Int. Cl.[5] F05C *17/00*
U.S. Cl. 292—267 **4 Claims**



1. A latch for mounting on a first and a second surfaces comprising in combination a bar assembly and a keeper assembly:

said bar assembly having:
- a mounting means adapted to be fixed to said first surface;
- an elongated bar made of a rigid sheet material and rotatably mounted to said mounting means by one end thereof;
- at least two pairs of aligned fingers made integral with and being laterally disposed on said bar at its other end whereby the distance between the first and second surfaces can be adjusted by removing at least one pair of fingers; and
- each pair of aligned fingers being spaced from the adjacent pair; and
- each of said fingers being disposed within the plain of said sheet material;

said keeper assembly comprising:
- a bracket adapted to be fixed to said second surface;
- said bracket being shaped so that a portion thereof is spaced from said second surface to form a space therebetween which has width, as measured between said second surface and said portion, greater than the width of one pair of said fingers and less than the width of two adjacent pairs of said fingers, measured longitudinally along said bar;
- said portion of said bracket having a T-shaped opening formed therein;
- a lock flap having one edge rotatably mounted to said bracket and having another edge remote from said one edge depending into said T-shaped opening;
- a spring means urging said other edge of said flap away from said second surface so that the pair of fingers located on the end said bar is capable of being nested between said portion of said bracket and said second surface.

4,929,005

DEVICE FOR TRANSFERRING ELECTRIC POWER

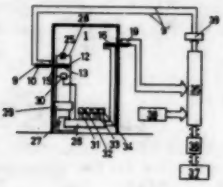
Hans-Dieter Heinen, Malmedy, Belgium, assignor to S.A. Ets. R. Heinen N.V., Malmedy, Belgium

Filed Oct. 28, 1988, Ser. No. 263,761

Claims priority, application European Pat. Off., Oct. 30, 1987, 87870153

Int. Cl.[5] E05C *19/16*

U.S. Cl. 292—251.5 **7 Claims**



1. A device for transferring electric power and/or information between two parts movable with respect to each other, in particular between a door frame and a door leaf or a casement window leaf, mounted in the door frame, comprising a first coil of an insulated conductor wire wound onto a first magnetic core, and a second coil of an insulated conductor wire wound onto a second magnetic core, the first coil intended to be connected to a power energy source and the core of the first coil mounted on the door frame, the core of the second coil mounted on an edge of the leaf, the first coil positioned opposite the second coil with its core when the leaf is in its closed position in the door frame forming a minimum air gap between the maghetic cores of the two coils so that said two cores determine a magnetic circuit in at least one determined position of said parts with respect to each other and allow a variable electric current travelling in said first coil to induce a variable magnetic flux in both cores, by inducing an electromotive force in the second coil and providing an electric current in said second coil when the latter is connected in a closed electric circuit, the device characterized in that each of said coils is connected in parallel to a capacitor so as to form resonant circuits, so that transfer of energy is essentially made at the resonance frequency of said circuits.

4,929,006

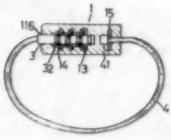
STRUCTURE OF SEALING STRING

Wen-Her Tsay, No. 29, Lane 111, Cheng-Ho Road, Kaohsiung, R.O.C., Taiwan

Filed Aug. 22, 1988, Ser. No. 234,744

Int. Cl.[5] B65D *33/34*

U.S. Cl. 292—324 **3 Claims**



1. A lock seal comprising:

a housing;

at least two lock retention sleeves disposed in said housing, each of said sleeves having a frustoconical portion defining large and small diameter opposite ends and a radially outwardly directed flange adjacent the larger diameter end thereof extending in a plane generally normal to the axes of said frustoconical sleeve portion, said sleeve being axially aligned within said housing;

a split ring disposed within each of the frustoconical portions of the sleeves;

means for retaining the split ring within said sleeve and enabling axial movement thereof;

a flexible element having opposite ends;

means cooperable between one end of said element and said housing for retaining the one end of said element in said housing; and

a pin carried by the opposite end of said flexible element and receivable axially within said sleeves, said pin having a plurality of circumferentially extending, axially spaced grooves, said split ring having an internal diameter smaller than the diameter of said pin such that each ring will at first expand upon insertion of the pin and then contract in a pin groove to retain the pin within the body upon attempted retracting movement of the pin from the body.

4,929,007

LATCH MECHANISM

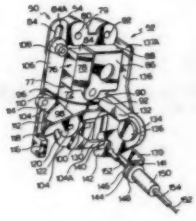
Andrzej Bartczak, Newmarket, and Roman Cetnar, Aurora, both of Canada, assignors to Magna International Inc., Markham, Canada

Filed Mar. 29, 1988, Ser. No. 174,947

Claims priority, application Canada, Mar. 30, 1987, 533372; Jul. 31, 1987, 543600

Int. Cl.[5] E05C *3/26*

U.S. Cl. 292—336.3 **131 Claims**



1. An operating mechanism suitable for use in a vehicle door latch mechanism comprising structural components for locking, the operating mechanism comprising:

(a) an inside handle release lever for being operated from the inside of the door;

(b) an outside handle release lever for being operated from the outside of the door;

(c) means for being engaged by the inside handle release lever and outside handle release lever, said means being connected to release the structural components of the latch mechanism for operation;

(d) at least one of the said inside handle release lever and outside handle release lever being movable to a position whereat the release lever cannot engage said means to release the structural components when operated.

4,929,008

IMPACT ABSORBER FOR VEHICLES

Rahman A. Esfandiary, 13148 Victory Blvd., Van Nuys, Calif. 91401

Filed Feb. 14, 1989, Ser. No. 309,849

Int. Cl.[5] B60R *19/18, 19/03, 19/34*; F16F *7/12*

U.S. Cl. 293—108 **2 Claims**

1. An impact absorber for vehicles comprising the combination of:

a vehicle;

bumper means carried on said vehicle;

said bumper means includes an elongated bumper outwardly supported from said vehicle by a pair of spaced-apart members;

said bumper is an elongated inflatable element having a central chamber occupied by pressurized air;

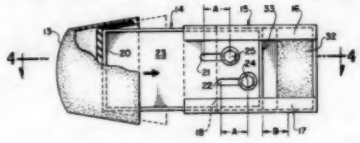
an air valve operably carried on said inflatable element in gated communication with said central chamber for passing pressurized air into said chamber;

each of said spaced-apart members constituting an elongated collapsible member having impact absorbing means and rate of collapse means midway between its opposite ends adapted to irreversibly collapse at a rate upon impact within a predetermined impact range;

each of said elongated members further including a pair of elongated member sections having their respective adjacent ends overlapped and yieldably coupled together to define said elongated member;

frictional release means yieldably joining said overlapped member section ends together;

said impact absorbing means includes a resilient material of greater resiliency than said member section carried on each end of said elongated member sections opposite to their overlapped ends;



one of said resilient materials being a cap fixed to said member section exteriorly thereof and the other one of said resilient materials being a pad internally carried by said member in direct interfering alignment with said other member section;

said frictional release means includes a pair of elongated, spaced-apart slots provided in one member section and a pair of holes provided in the other member section adjacent with and in alignment with said slots and holes respectively;

said bolt fasteners characterized as tightened with a predetermined torque sufficient to hold said member sections together and being yieldable to permit sliding of one member section respective to said other member section upon increase of impact force beyond said impact range; and

said bolt fasteners further characterized as shear off bolts breakage upon attainment of impact forces beyond said impact range of permanent collapse.

4,929,009

END EFFECTOR

Ron Vandersluis, Bramalea, and Erik Quittner, Toronto, both of Canada, assignors to National Research Council of Canada/-Conseil National de Reserches du Canada, Ottawa, Canada

Continuation-in-part of Ser. No. 152,392, Feb. 4, 1988, abandoned. This application Apr. 14, 1989, Ser. No. 338,155

Claims priority, application Canada, Sep. 28, 1987, 548057

Int. Cl.[5] B25J *15/08;* **B64G** *1/64*

U.S. Cl. 294—2 **4 Claims**

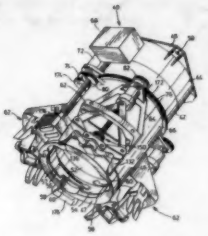
1. An end effector comprising;

(a) a grapple housing having a proximal end, a distal end, a grapple chamber and a grapple passage opening extending from the grapple chamber through the distal end,

(b) grappling means in the grapple chamber, the grapple means being for snaring a grapple fixture,

(c) latching means on the exterior of said grapple housing, said latching means being operable to latch the end effector to the grapple fixture to prevent separation of the end effector and the fixture whereby substantial forces can be transmitted through the end effector,

(d) first umbilical connector means mounted on said grapple housing for, in operation, movement towards the distal end of said grapple housing to mate with second umbilical cord connector means carried by a grapple fixture,



(e) connector drive means mounted on said grapple housing for, in operation, driving the first umbilical connector means towards and away from the distal end.

4,929,010

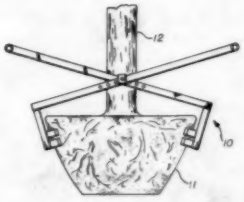
PORTABLE LIFTER

Gary P. Lahti, 520 Howard St., Lunenburg, Mass. 01462

Filed Oct. 25, 1989, Ser. No. 426,563

Int. Cl.[5] B25B *7/04*

U.S. Cl. 294—16 **1 Claim**



1. A lifter, said lifter comprising in combination

a left leg and a right leg which legs are pivotally joined at or near their mid-section by a pin;

each said leg comprising a handle at one end and a foot at it's opposite end;

each said handle being attached such that it forms a T-shape with it's leg;

one such foot being attached to the right leg such that it forms an L-shape;

one such foot being attached to the left leg such that it forms a J-shape;

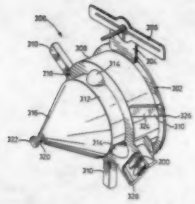
said handles and said feet being aligned in the same plane;

each said foot having attached thereto an arm;

each arm having at least one semicircular cross finger attached thereto and all semicircular cross fingers arranged such that their concave sides face each other;

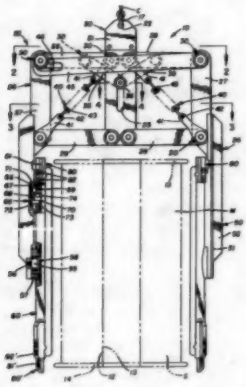
said legs being arranged such that they pivot around the pin when the handles are moved toward each other.

4,929,011
GRAPPLE FIXTURE
Ron Vandersluis, Bramalea, and Erik Quittner, Toronto, both of Canada, assignors to National Research Counsil of Canada/-Conseil National de Recherches du Canada, Ottawa, Canada
Continuation-in-part of Ser. No. 152,392, Feb. 4, 1988, abandoned. This application Apr. 14, 1989, Ser. No. 338,156
Int. Cl.[5] B25J 19/00; B64G 1/64
U.S. Cl. 294—86.4 6 Claims



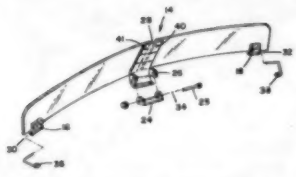
1. A grapple fixture, comprising;
(a) a base comprising a mounting flange with an outwardly extending cylindrical body having an outer, annular, end effector abutment face,
(b) an end effector latching trunnion attached to, and extending radially in a lateral direction from, the cylindrical body,
(c) a substantially cone-shaped, grapple fixture aligning body extending outwardly from the cylindrical body, the cone-shaped body having a cylindrical, end effector locating, base portion attached to the abutment face, and
(d) a laterally extending, grapple fixture recess engaging, rounded shoulder extending around a portion of the cylindrical base and secured against relative movement to the abutment face.

4,929,012
CREEL LOADING APPARATUS
Raymond J. Slezak, Barberton, Ohio, assignor to RJS Corporation, Akron, Ohio
Filed May 12, 1988, Ser. No. 193,355
Int. Cl.[5] B66C 1/30
U.S. Cl. 294—86.41 11 Claims



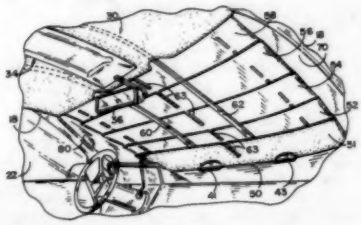
1. A loading apparatus suspended by a cable for grasping a containerized spool, including strand material disposed thereon, transporting the spool to a position proximate a creel and orienting the spool for positioning on a creel spindle comprising, a plurality of substantially parallel arm means, shoe means carried by said arm means, gripping means on said shoe means for engaging the spool, lifting link means adapted for attachment to the cable, linkage means interposed between said lifting link means and said arm means and maintaining said arm means substantially parallel while bringing said gripping means into and out of engagement with the spool, and means pivotally mounting said shoe means relative to said arm means for selectively rotationally orienting the spool, said shoe means having a longitudinally elongate, laterally curved plate configured to circumferentially engage a portion of the circumference of the strand material on a spool and finger means projecting from the longitudinal extremities of said plate to engage radially outward extremities of flanges at the axial extremities of the spools.

4,929,013
AIRFLOW DEFLECTOR APPARATUS
Alan B. Eke, Menomonie, Wis., assignor to Lund Industries, Inc., Coon Rapids, Minn.
Filed Jun. 27, 1989, Ser. No. 372,034
Int. Cl.[5] B60T 1/20
U.S. Cl. 296—91 4 Claims



1. Airflow deflector apparatus adapted to be mounted on the hood of a vehicle comprising:
first and second wing means for deflecting airflow;
a center hinge means, coupled to said wing means, for permitting said wing means to be rotated into a collapsed position in substantial conformity with said hood, and for permitting said wing means to be rotated into an erected position to deflect airflow over said hood,
first and second side hinge means defining first and second hinge axis, said hinge means being coupled to said wing means for permitting rotational and longitudinal movement of each of said wing means relative to a respective one of said first and second axis.

4,929,014
FULL WINDSHIELD SUNSHADE
Robert J. Clark, and Patrick W. Binish, both of Holland, Mich., assignors to Prince, Holland, Mich.
Filed Dec. 27, 1988, Ser. No. 290,703
Int. Cl.[5] B60J 3/02
U.S. Cl. 296—97.8 30 Claims



1. A visor system for a vehicle comprising:

a visor including a plurality of horizontally extending elongated generally rectangular panels arranged in sliding overlapping relationship to each other; and

means for mounting said panels for movement between a stored substantially overlapped position adjacent a vehicle roof to extended positions covering a vehicle window, wherein said panels are interconnected by means of a pair of flexible spaced ribbons coupled to each panel.

4,929,015

CONVERTIBLE TOP FOR VEHICLES, PARTICULARY FOR MOTOR CARS

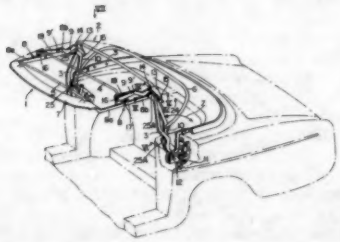
Theodor Bauer, Altenriet, Fed. Rep. of Germany, assignor to Daimler-Benz AG, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 14,848, Feb. 13, 1987, abandoned, which is a continuation of Ser. No. 702,660, Feb. 19, 1985, abandoned. This application Jul. 6, 1988, Ser. No. 215,505

Claims priority, application Fed. Rep. of Germany, Feb. 18, 1984, 3405920

Int. Cl.[5] B60 *7/12*

U.S. Cl. 296—116 **12 Claims**



8. A foldable frame for supporting a convertible top of a vehicle having a tonneau space, the foldable frame being movable between a retracted and an extended position, and comprising;

a main hoop mounted to respective opposite sides of the vehicle for pivotable movement about a transverse axis of the vehicle, the main hoop defining a pair of diverging, laterally spaced-apart side members and an integral top therebetween, each side member being inclined in relation to the top member to define an obtuse angle therebetween,

a pair of foldable side frame linkage means, each of said pair of said foldable side frame linkage means being connected to a corresponding side member and being folded to substantially half of an extended length when said foldable frame is in said retracted position, and

aligning means for aligning each of said folded frame linkage means substantially parallel to a corresponding said side member when said foldable frame is in said retracted position.

4,929,016

BI-DIRECTIONAL ROOF MOUNTED CAR PROTECTIVE DEVICE

Paraskevas N. Kastanis, 6009 Woodbridge Rd., Charlotte, N.C. 28212

Filed Mar. 8, 1989, Ser. No. 320,510

Int. Cl.[5] B60J *7/20*

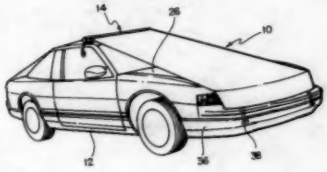
U.S. Cl. 296—136 **5 Claims**

1. An apparatus for covering selected portions of a vehicle, comprising:

a pair of extendable and retractable, flexible, sheet-like covering means, each covering means having a lateral extent corresponding generally to the lateral extent of a vehicle on which the cover is to be used, and the pair of covering means having a combined longitudinal extent corresponding generally to the longitudinal extent of the selected portion of the vehicle to be covered, each covering means being movable between a first, fully extended position for covering the selected portion of the vehicle and a second, retracted position for storage;

a pair of means, each coupled to a respective one of the covering means, for winding the covering means about an axis;

a housing for supporting the pair of winding means relative to one another such that they are closely adjacent and



their winding axes are in substantially parallel relation to one another;

means, connected to the housing, for selectively securing the housing to an exterior surface of the vehicle, said means including a plurality of suction devices for engaging opposite side windows of the vehicle; and

means, connected to said covering means, for selectively securing said covering means in extended covering relation to the vehicle.

4,929,017

ARMREST FOR VEHICLES AND METHOD OF MAKING SAME

Cal A. Lilienthal, and Ronald L. Christensen, both of Iowa City, Iowa, assignors to Purethane Incorporated, West Branch, Iowa

Filed Oct. 28, 1988, Ser. No. 263,880

Int. Cl.[5] B60N *1/02*

U.S. Cl. 296—153 **4 Claims**

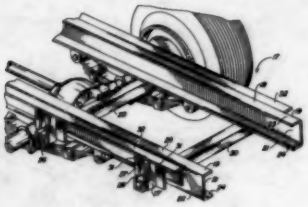
1. A grab-handle armrest unit for a vehicle door and having an outboard side engageable with the door when the unit is affixed to it and an inboard side facing away from the door, said unit comprising a structural insert of generally rigid material, the insert including a grab-handle portion and an armrest portion separable from the grab-handle portion, a vinyl skin covering the unit on all surfaces except that portion of the outboard side that engages the vehicle door, urethane foam filling all spaces in the unit between the insert and the vinyl skin, the grab-handle portion of the unit being covered only with vinyl, and the urethane foam filling the unit along the inboard side and top of the armrest to provide cushioned surfaces.

4,929,018

TRUCK RAMP STORAGE ARRANGEMENT

William E. Carty, Tempe, Ariz., assignor to U-Haul International, Phoenix, Ariz.

Filed Jul. 1, 1988, Ser. No. 214,516
Int. Cl.[5] B62D 27/02
U.S. Cl. 296—204 9 Claims



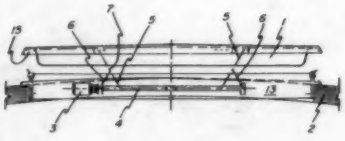
1. In a truck chassis, a pair of longitudinal frame members, said longitudinal frame members being characterized by having C-shaped cross-sections providing closed outer faces and having open regions facing each other, a transverse frame member positioned beneath said longitudinal members and having end regions extending beyond the transverse extent of said longitudinal members, and bracket means secured to the outer face of each of said longitudinal members and extending downwardly from said longitudinal members, said bracket means being secured to the end regions of said transverse member, the arrangement being such that the space above said transverse member and between said longitudinal members including the open regions of said longitudinal members is open to provide a storage space.

4,929,019

DEVICE FOR OPENING AND CLOSING THE ROOF HATCH OF A VEHICLE

Taisto Pääkkönen, Raisio; Vainino Veijo, and Turpeinen Jarkko, both of Parainen, all of Finland, assignors to Oy Parton Ab, Parainen, Finland

Filed Jan. 17, 1989, Ser. No. 297,905
Claims priority, application Finland, Jan. 19, 1988, 880218
Int. Cl.[5] B60J 7/057
U.S. Cl. 296—223 7 Claims



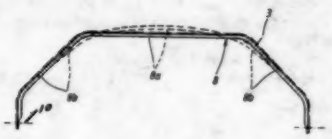
1. An opening and closing device for a vehicle roof hatch (1), comprising a bar (4) fixedly fitted to an edge surrounding a vehicle roof aperture and two lever systems (5, 6, 7) which are identical but installed as mirror images of each other, each lever system consisting of a long arm (5) one end (5c) of which is movably fastened to the bar and another, upper end (5d) thereof fastened to the roof hatch, and of a short arm (6) one end (6b) of which is fastened pivotably to the bar and another end is pivotably fastened between the ends of the long arm (5), in which case a corresponding area of the roof hatch can be caused to move in a vertical direction by moving the movable end of the long arm; wherein the bar (4) is threaded so that two halves thereof are threaded longitudinally in opposite directions, a length of the short arm (6) is one-half of a length of the long arm (5) and the short arm (6) is articulated (7) to a middle of the long arm.

4,929,020

STRUT FOR A FOLDING VEHICLE COVER

Jürgen Schrader, Stuttgart, and Klaus Claar, Sindelfingen, both of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Fed. Rep. of Germany

Filed Oct. 7, 1988, Ser. No. 254,806
Claims priority, application Fed. Rep. of Germany, Oct. 7, 1987, 3733842
Int. Cl.[5] B60J 7/12
U.S. Cl. 296—118 5 Claims



1. A strut for a folding vehicle cover movable between a stored position and a raised, closed position and having a roof skin and a vehicle cover frame, the folding vehicle cover bridging a roof width and comprising:

a central strut section;

a strut flank extending outwardly at an angle from each end of the central strut section, the central strut section and strut flanks being raisable in a strut plane relative to braced ends of the strut flanks between a stored position and a raised, locked position;

spring loading means formed by the central strut section and at least a portion of the strut flanks and having a bowed, relaxes configuration and a stressed tensioned configuration for providing a taut roof skin when the folding vehicle cover is closed, such that when the strut in in the raised locked position, the spring loading means occupies an upper limit position while in the bowed relaxed configuration which is located above a lower tensioned position of the spring loading means while in the stressed tensioned configuration; and

means for integrating the strut into the vehicle cover frame by articulately bracing the strut flanks against associated side wall frame parts of the vehicle cover frame,

wherein in a final closing phase of the folding cover the spring loading means in automatically lowered out of the bowed, relaxed position counter to a spring biasing force of the roof skin into the stressed, tensioned position under the influence of longitudinal tensile forces in the roof skin resulting from a final closing movement of the folding cover form a partially closed position to a fully closed position.

4,929,021

ORNAMENT DISPLAYING FURNITURE

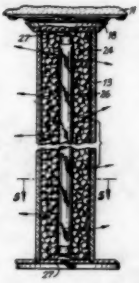
Howard Kaye, Greenwich, Conn., assignor to Designs For Leisure, Ltd., Mount Kisco, N.Y.

Filed Nov. 14, 1988, Ser. No. 270,681
Int. Cl.[5] A47C 7/00
U.S. Cl. 297—193 2 Claims

1. An ornament displaying article of furniture comprising a weight-bearing surface member constructed as a seat for an occupant, a base and a hollow support element interconnecting said base and weight-bearing surface member and being releasably connected to one of said weight-bearing surface member and base, an ornamental display within the hollow interior of said support element, said ornamental display being visible from outside the article of furniture and changeable upon

releasing one of said weight bearing surface member and base from said hollow support element,

said hollow support element comprising a cylindrical column member having a light transmitting portion and a transparent section thereof through which said ornamental display is visible from outside of the article of furniture, and



said ornamental display comprising a plurality of light reflective materials substantially filling said hollow support element, said light reflective materials comprising colored marbles.

4,929,022

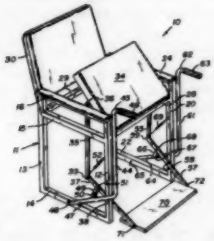
CHAIR HAVING LIFT APPARATUS

Alexander Geraci, 5221 N. Lind Ave., Chicago, Ill. 60630

Filed Feb. 23, 1989, Ser. No. 314,164

Int. Cl.[5] A47C *1/02*

U.S. Cl. 297—313 **16 Claims**



1. A chair having lifting means for assisting a physically impaired occupant to arise out of the chair, comprising:

a frame,

a seat hingedly mounted at its forward edge to said frame,

foot-operated lever means pivotally mounted on said frame having a foot rest to one end,

manually operated lever means pivotally mounted on said frame having hand engaging means at one end,

coupling means pivotally connected to both said foot-operated means and said manually operated means arranged to combine the forces generated by each of said lever means, and

seat lift lever means pivotally connected at one end to one of said foot-operated lever means or said manually operated lever means, and at the other end to said seat,

the arrangement being such that when the occupant applies force to both said foot-operated lever means and said manually operated lever means, the combined force is transmitted to said seat and causes said seat to push said occupant out of the chair.

4,929,023

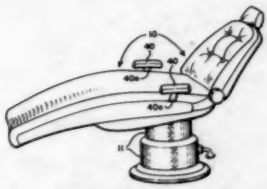
POSITION-ADJUSTING APPARATUS FOR MOUNTING A RECLINING CHAIR ON A PEDESTAL BASE

Lyle S. Rasmussen, 245 N. Vine St., Salt Lake City, Utah 84103

Filed Mar. 14, 1989, Ser. No. 323,309

Int. Cl.[5] A47C *1/00*

U.S. Cl. 297—330 **16 Claims**



1. A conversion unit for pedestal mounted, reclining chairs, comprising an elongate chassis frame having a chair seat frame section and a chair back frame section interconnected end-to-end for pivotal movement relative to each other; means pivotally interconnecting the two frame sections; a mounting plate intermediate the length of said chassis frame for fixed attachment to a pedestal base; motivating mechanism supported by said frame for rocking said chassis frame either backwardly or forwardly along its longitudinal axis and including a reversible electric motor, a screw extending longitudinally of said frame, and an elongate actuator arranged to be moved back or forth by said screw; master bell crank means; means pivotally interconnecting said master bell crank means with said actuator; linkage means pivotally interconnecting said master bell crank means with said chair seat frame; a rocker shaft extending transversely of said chair seat frame section, said shaft being carried by said mounting plate and journaled by said master bell crank means; respective secondary bell crank means pivotally connected to opposite ends, respectively, of said shaft; a second transverse shaft; structural means extending from fixed connection with said chair back frame section to pivotal connection with opposite ends, respectively, of said second transverse shaft; respective second linkage means pivotally interconnecting said secondary bell crank means with opposite ends of said second transverse shaft, respectively; respective third linkage means pivotally interconnecting said secondary bell crank means, respectively, with said chair seat frame section; respective bracket members fixedly secured to said chair seat frame section in mutually spaced relationship transversely of said chassis frame; respective rods extending longitudinally of each chassis frame and having one set of corresponding ends pivotally attached to said second transverse shaft, the opposite set of corresponding ends passing slidably through said bracket members, respectively; and respective coil compression springs carried longitudinally by said rods, respectively, with their opposite ends abutting said second transverse shaft and said bracket members, respectively.

4,929,024

POWER SEAT RECLINER

Tyrone R. Secord, Sterling Heights, Mich., assignor to Fisher Dynamics Corporation, St. Clair Shores, Mich.

Filed Jun. 29, 1989, Ser. No. 373,248

Int. Cl.[5] B60N *1/06*

U.S. Cl. 297—362 **5 Claims**

1. A motor vehicle power seat recliner comprising:

an upper recliner structure for supporting a seat back cushion,

a lower recliner structure for supporting a seat bottom cushion,

first pivot means for enabling the reclined angle between said upper and lower recliner structure to be adjusted,

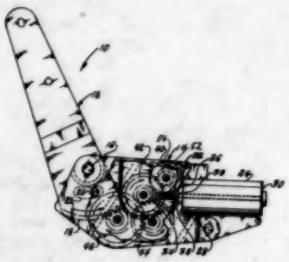
a toothed quadrant coupled to said upper recliner structure,

an electric motor having an elongated casing with first and

second axial ends, with a drive shaft extending from said first end, said lower recliner structure supporting said motor adjacent both said first and second ends,

a worm gear affixed to said drive shaft and fixed thereto for rotation, and

gear train means for providing a gear reduction and for communicating rotation of said drive shaft to said toothed



rack, said gear train means including a plurality of gears consecutively intermeshed and each having a larger diameter toothed section for driving an adjacent gear through its smaller diameter toothed section, one of said gears meshed with said worm gear and another of said gears driving said toothed quadrant whereby rotation of said drive shaft causes the reclined angle between said upper and lower recliner structures to be varied.

4,929,025

SPRING-LOADED SEAT ASSEMBLY

Chin S. Lu, No. 50, Lane 262, Chen Hsing Rd., Taichung City, Taiwan

Filed Oct. 11, 1989, Ser. No. 419,676
Int. Cl.[5] A47C 7/02
U.S. Cl. 297—452 **4 Claims**

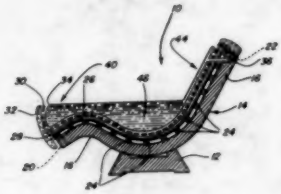
1. A spring-loaded seat assembly comprising an upper seat and a lower seat with a plurality of spring members connected therebetween; a recess being formed on a respective outer surface of said upper and said lower seats; a number of hooks being formed on a respective inner surface of said seats for engaging both ends of said spring members so that said seats are resiliently connected together; a peripheral flange being formed on a respective inner peripheral surface of each said seat and extending vertically toward each other; and a damping mechanism being provided between said seats.

4,929,026

SEATING STRUCTURE WITH DISPLACEABLE WATER BLADDER

Barry D. Barbelet, 405 6th St., Pinetops, N.C. 27864

Filed Mar. 15, 1989, Ser. No. 324,010
Int. Cl.[5] A41C 3/00
U.S. Cl. 257—454 **6 Claims**



1. A water containing seat structure having a displacable well portion comprising:

(a) a base;

(b) a contoured frame structure supported by the base and including a leg support area, a well cavity, and an inclined back;

(c) a water containing bladder supported on the contoured frame structure and including a water well lying between the back and the leg area and wherein in a no-load mode the upper most level of the water well terminates about a lower portion of the back;

(d) the water bladder further including a leg support portion that extends from the water well over the leg support area;

(e) the water bladder further including in a no-load mode an empty back portion that is communicatively open to the water well and extends up the inclined back of the contoured frame; and

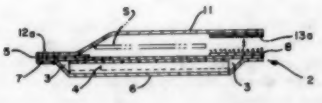
(f) wherein the water well forms a relatively deep water pocket in the no-load mode and is particularly disposed with respect to the empty back portion of the water bladder such that by placing a load on the water well results in the water within the water well being displaced therefrom and upwardly into the back portion of the water bladder where the displaced water generally conforms to the shape of the back area of a person imposing the load on the water well.

4,929,027

PASSIVE RESISTANCE ENHANCER FOR SAFETY SEAT BELT

Roger R. Beauvias, II, 6246 Dulin Creek Rd., House Springs, Mo. 63051

Filed Oct. 24, 1988, Ser. No. 261,421
Int. Cl.[5] B60R 21/00
U.S. Cl. 297—482 **1 Claim**



1. A passive resistance enhancer for application in supplementing the safety of a seat belt during usage, and for application in conjunction with a seat belt of the shoulder harnessing type as provided in vehicles, comprising, a sleeve means of flexible material having first and second channels provided therethrough and extending approximately throughout its length, said sleeve means having a forward surface and a rearward surface, a first channel provided proximate the forward

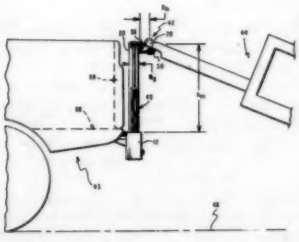
surface within the structure of the sleeve means, and a second channel disposed proximate the rearward surface within the structure of the sleeve means, said seat belt being disposed within said first channel provided proximate the forward surface within the structure of the sleeve means, said passive resistance enhancer including a substantially rigid support, said substantially rigid support contained within the second channel and disposed proximate the rearward surface within the structure of the sleeve means, so as to retain said substantially rigid support and seat belt in separate but adjacent locations within said sleeve means, said rearward surface of the sleeve disposed for resting against the user of the seat belt, said rigid support being at least equal to or wider than the adjacent seat belt, and said rigid support being integral and extending approximately the length of said sleeve, such that upon encountering an impacting force the seat belt biases against said rigid support for dissemination of the forces of impact over a greater surface area for minimizing any damage to the person being passively restrained, said rigid support substantially incorporating undulations along its length to provide for its further cushioning and flattening through longitudinal expansion upon its wearer encountering an impacting force, said sleeve means and substantially rigid support being removable affixed to said seat belt, said second channel within the sleeve means forming a first pocket within which the substantially rigid support inserts, and closure means provided for retaining said substantially rigid support entirely within said first pocket, said first channel provided within said sleeve forming a second pocket into which said belt inserts, and closure means provided for retaining said seat belt within said second pocket, said first and second channels having an intermediate layer disposed longitudinally therebetween, and a liner forming the forward surface of the first channel, closure means provided at least along one side of the liner and layer for providing for their securement together, wherein said closure means comprises stitching along one side edge of the line, securing it within the underlying sleeve means to the layer, and a hook and pile fastening means provided along the other side edge of said liner, removably securing it to the layer of the underlying sleeve means, wherein said hook and pile fastening means capable of being opened for removal of the seat belt from within the first channel and its separation from the sleeve means and the substantially rigid support, said rigid support is formed of a resilient polymer, and said polymer comprising polycarbonate, and wherein said sleeve means incorporates cushioning material so as to cushion the impact of the sleeve means against the wearer upon encountering an impacting force.

4,929,028

LIFT HITCH

Lowell A. Underwood, P.O. Box 452, Prosper, Tex. 75078

Filed May 13, 1988, Ser. No. 193,774
Int. Cl.[5] B60P *1/16*; B62D *53/04*
U.S. Cl. 298—19 R **33 Claims**



1. A hitch comprising:

a. an elongated chamber-like structure having an open top and an interior in communication with said top, said chamber-like structure having a configuration adapted for anchoring to a structural part of a mobile transporting means and is sized and configured like a conventional pickup truck bumper;

b. an engageable member mounted for movement with respect to said chamber-like structure, said engageable memb- adapted for connection to a structural trailer part;

c. means for causing said engageable member to move with respect to said chamber-like structure, said causing means being extendable through said top of said chamber-like structure in order to move said engageable member to a desired location away from said chamber-like structure, said causing means being retractable to a stowed configuration inside said chamber-like structure so as to position said engageable member immediately adjacent said chamber-like structure; and

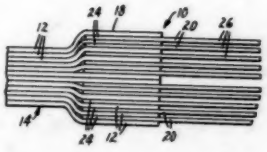
d. means for actuating said causing means.

4,929,029

BRUSH MANUFACTURING METHOD

Edward W. Deziel; John T. Rueb; Mark D. Sorlien; Jack A. Dahlstrom, and David W. Erismann, all of St Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Division of Ser. No. 57,214, May 8, 1987, Pat. No. 4,821,359.
This application Feb. 21, 1989, Ser. No. 312,718
Int. Cl.[5] A46D *1/08*
U.S. Cl. 300—21 **10 Claims**



1. A method for forming brushes comprising the steps of:

cutting one or more sheets to form a plurality of plies each having a handle end portion and an opposite head end portion, the plies being attached together at spaced locations in a single layer and being disposed with the head end portions of the plies projecting in opposite directions, the head end portions of the plies projecting in each direction being closely adjacent in side by side relationship and having generally aligned end surfaces, and the handle end portions of plies projecting in one of the directions being interdigitated with the handle end portions of plies projecting in the other of the directions;

forming a fibrillatable oriented polymeric film;

cutting the film into a plurality of pieces having generally uniform lengths in the direction of orientation and including a first set of pieces having widths transverse to the direction of orientation generally corresponding to the total width of the head portions projecting in one direction and a second set of pieces having widths transverse to the direction of orientation generally corresponding to the total width of the head portions projecting in the other direction;

adhering one piece of the film from each set to each of certain ones of the single layers with the end surfaces transverse to the direction of orientation and a minor end portion of one of the pieces of film overlaying and adhered to the head end portions of the plies projecting one of the directions to which it corresponds in width, and a minor end portion of the other of the pieces of film overlaying and adhered to the head end portions of the plies projecting in the other of the directions and with major end portions of the pieces of film projecting from the head end portions in opposite directions;

separating the major end portions of the pieces of film adhered to the single layers into individual bristles; and

laminating the single layers together in aligned relationship with the minor end portions of the pieces of film laminated between the single layers to form a composite comprising a plurality of the brushes each comprising a laminate having a handle end portion adapted for manual engagement, and an opposite head end portion; and a plurality of rows of bristles, each row having a base end portion formed by a part of one of the minor portions of the pieces of film adhered between a different pair of adjacent plies in the head end portion of the laminate and having distal end portions projecting outwardly from the head end portion, the distal end portions of the rows of bristles extending generally in the same direction, the laminates being attached together at the spaced locations to form a single plate like structure and being disposed with the head end portions of the laminates projecting in opposite directions, the head end portions of the laminates projecting in each direction being closely adjacent in side by side relationship, and the handle end portions of laminates projecting in one of the directions being interdigitated with the handle end portions of laminates projecting in the other of the directions, the laminates being separable by breaking the spaced locations to separate individual ones of the brushes.

4,929,030

STATIONARY MEMBER ON AUTOMOTIVE HUB CAP

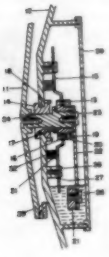
Seung M. Park, #92-12, Yonbee-2dong, Seodaemunku, Seoul, Rep. of Korea

Filed Jan. 30, 1989, Ser. No. 302,895

Claims priority, application Rep. of Korea, Feb. 2, 1988, 88-1204

Int. Cl.[5] B60B *7/00*

U.S. Cl. 301—37 N **2 Claims**



1. An (The) automobile hub cap having a center on which a static lateral axle is supported by a bearing and a bushing with ribs at the center of said static lateral axle, a supporting plate fixed by screws and bosses to an inner side of said hub cap, said supporting plate supporting said bearing, said bushing and said static lateral axle supported by said bearing and said bushing; a clutch plate fixed at one of its ends to the inner end of said static lateral axle, an eccentric bob fixed to the other end of said clutch plate, a static member fixed at an outer end of said static lateral axle and on a front side of said hub cap; a rubber sealing ring between said hub cap and said supporting plate; a rear cover over a rear side of said hub cap covering said supporting plate and said clutch plate; and a lubricating oil supply between said rear side of said hub cap and said rear cover.

4,929,031

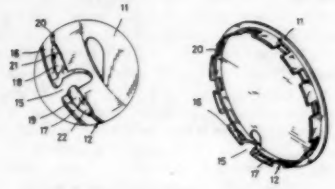
STRUCTURE OF HUB CAP FOR CAR WHEEL

Liou Shenq-Gwo, P.O. Box 96-405, Taipei 10098, Taiwan

Filed Nov. 21, 1988, Ser. No. 274,339

Int. Cl.[5] B60B *7/00*

U.S. Cl. 301—37 P **1 Claim**



1. A hub cap for car wheel mainly comprising a hub cap and a flexible ring insert;

said hub cap including a plurality of click sheets and a notch; and each of said click sheets having a flange end to be retained under the flange of a wheel rim edge, and each said click sheet having a groove in the inner side thereof for retaining a section of said flexible ring insert; and two click sheets adjacent each side of said notch being furnished with positioning flanges for receiving two ends of said flexible ring insert;

said flexible ring insert including a metal ring having two ends, two rubber caps mounted on two ends of said metal ring; and said rubber caps being positioned in said positioning flanges respectively, and the remainder of said metal ring being mounted in said grooves on the inner side of said click sheets of said hub cap; thereby enabling said hub cap to be mounted on a car wheel flexibly and firmly.

4,929,032

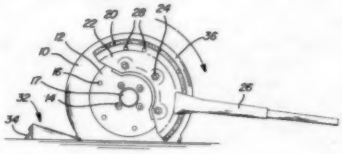
EMERGENCY SPARE WHEEL AND METHOD AND APPARATUS FOR INSTALLING SAME

Manfred A. Isaacson, 2323 Oakway, West Bloomfield, Mich. 48033

Filed Jul. 11, 1988, Ser. No. 217,313

Int. Cl.[5] B60B *19/00*

U.S. Cl. 301—38 R **2 Claims**



1. A method for mounting a spare tire on a vehicle wheel and tire assembly having a flat tire without removing the flat tire from the vehicle wheel, wherein the spare tire comprises two complemental sections having ground-engaging peripheral portions and, together, forming a circular spare tire, comprising the following steps:

mounting a first spare tire section on an upper part of said vehicle wheel and tire assembly such that the spare tire section is not in contact with the ground;

placing a ramp block adjacent the ground-contacting portion of said flat tire opposite the ground-contacting end of said first spare tire section, said ramp block being of sufficient height to elevate the vehicle onto the ground engaging portion of the installed spare tire section;

applying torque to rotate said vehicle tire and wheel assembly up, over and beyond said ramp block such that said

vehicle tire and wheel assembly is essentially resting upon the ground-engaging portion of said first spare tire section; and, thereafter,

mounting a second spare tire section complemental with the first section on said vehicle wheel and tire assembly.

4,929,033

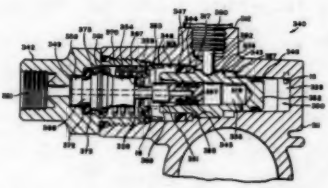
PRIMARY AND SECONDARY PRESSURE-BALANCED PROPORTIONING VALVE

Richard A. Zander, Niles; Robert F. Gaiser, Stevensville, both of Mich.; William F. Dillon, Jr., South Bend, and Donald A. Crumb, Granger, both of Ind., assignors to Allied-Signal Inc., Morristown, N.J.

Continuation-in-part of Ser. No. 7/067,514, Jun. 29, 1987, Pat. No. 4,821,519, and a continuation-in-part of Ser. No. 7/160,784, Feb. 18, 1988, Pat. No. 4,815,292. This application Nov. 3, 1988, Ser. No. 266,964

Int. Cl.[5] B60T *11/20*

U.S. Cl. 303—9.63 **8 Claims**



1. A proportioning valve in combination with warning means, the proportioning valve received in a bore having communication means for receiving fluid pressure communicated to the bore, the bore having at one end a first pressure receiving chamber and at the other end a second pressure receiving chamber, the second pressure receiving chamber having an outlet opening, a differential area piston disposed within said bore and having a first end received in the first pressure receiving chamber and a second end received in the second pressure receiving chamber, the first end having a seal thereat in order to define a part of the primary pressure receiving chamber, the second end having first sealing means disposed thereat, the differential area piston comprising a first piston part and a second piston part, the first piston part having a blind bore with an end opening at the second piston part, the first piston part having an orifice communicating the blind bore with an intermediate chamber defined between said seal and second sealing means disposed at an opposite end of the first piston part, the second piston part having an extension extending into the blind bore, the extension having a seal member which controls fluid flow through a first opening in the extension, the blind bore in the first piston part and the orifice sized so that the velocity of movement of the extension out of the blind bore is reduced during a release phase of braking, the first opening communicating with a longitudinal opening extending in said second piston part, the second piston part biased by resilient means toward said outlet opening, the first piston part having an exterior which includes a circumferential groove thereabout, and warning means extending into the intermediate chamber to engage the groove, so that failure of pressure in one of the first and second pressure receiving chambers causes the first piston part to be displaced and effect operation of said warning means.

4,929,034

ANTI-LOCKING BRAKE CONTROL SYSTEM

Volker Braschel, Heilbronn, and Dieter Seitz, Schwieberdingen, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Fed. Rep. of Germany

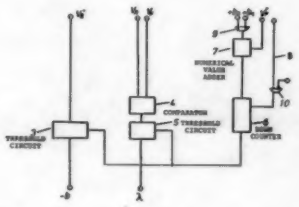
PCT No. PCT/EP87/00167, § 371 Date Sep. 26, 1988, § 102(e) Date Sep. 26, 1988, PCT Pub. No. WO87/05872, PCT Pub. Date Oct. 8, 1987

PCT Filed Mar. 25, 1987, Ser. No. 274,143

Claims priority, application Fed. Rep. of Germany, Mar. 26, 1986, 3610186

Int. Cl.[5] B60T *8/58, 8/60, 8/32*

U.S. Cl. 303—103 **13 Claims**



1. An anti-locking brake control system of the type comprising wheel velocity pickups, an evaluation circuit, and brake pressure control valves, said pickups providing signals to said evaluation circuit which determines therefrom the wheel retardation, wheel slippage, and wheel acceleration, said evaluation circuit providing signals to the brake pressure control valves to relieve pressure when an instability threshold based on at least one of wheel retardation and wheel slippage is reached, said evaluation circuit comprising

a summing circuit which provides a sum indicative of said instability threshold at which braking pressure is relieved,

means for reducing the sum in accordance with a given function,

means for increasing said sum by a numerical value whenever a wheel acceleration of a given magnitude occurs after an instability threshold is reached, the instability threshold at any time being determined by the magnitude of the sum at that time.

4,929,035

ANTI-LOCK CONTROL SYSTEM FOR MOTOR VEHICLES

Haruki Shimanuki, Kasukabe, Japan, assignor to Akebono Brake Industry Co. Ltd., Japan

Filed Feb. 7, 1989, Ser. No. 307,617

Claims priority, application Japan, Feb. 8, 1988, 63-25705

Int. Cl.[5] B60T *8/62*

U.S. Cl. 303—106 **4 Claims**

1. An anti-lock control system for motor vehicles, wherein a low peak of a wheel speed is detected which occurs when the wheel speed as decreased by a pressure buildup of a brake hydraulic pressure is changed from decrease to increase by a pressure reduction of the brake hydraulic pressure, and said pressure reduction is interrupted at a time point when said low peak of the wheel speed is detected, said anti-lock control system comprising:

means for judging the friction coefficient of a road surface on which the motor vehicle runs;

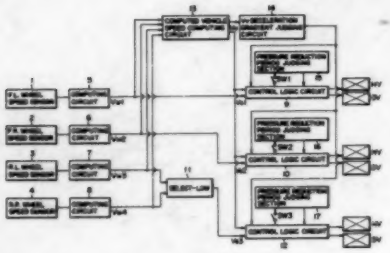
means for setting up a normal pressure reduction period for the brake hydraulic pressure;

means arranged to interrupt said pressure reduction at the end of said normal pressure reduction period under such conditions that said friction coefficient is equal to or higher than a predetermined value and said normal pressure reduction period elapses before said low peak occurs;

means for computing a computed vehicle speed by selecting

the highest one of four wheel speeds and limiting the deceleration and acceleration of the selected highest wheel speed to be in a predetermined range; and

means for computing a pressure reduction resuming threshold speed which is lower than and follows said computed vehicle speed in a predetermined relationship therewith, wherein when said normal pressure reduction period elapses at a time point that is later than a time point when the pressure reduction is started but earlier than a time point when the wheel speed becomes lower than said



pressure reduction resuming threshold, the interruption of the pressure reduction is effected at the end of said normal pressure reduction period; and when the wheel speed becomes lower than said pressure reduction resuming threshold speed after the pressure reduction has been interrupted, reduction of the brake hydraulic pressure is resumed at a time point when the wheel speed reaches said pressure reduction resuming threshold, and the pressure reduction is continued until a low peak of the wheel speed occurs.

4,929,036

HYDRAULIC BRAKE PRESSURE CONTROL DEVICE FOR A VEHICLE

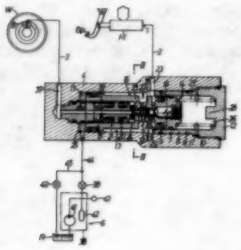
Yoshihiro Iwagawa; Toshio Yahagi, and Etsuo Fujii, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 22, 1989, Ser. No. 369,887

Claims priority, application Japan, Jun. 24, 1988, 63-157088

Int. Cl.[5] B60T *8/42*

U.S. Cl. 303—115 **5 Claims**



1. A hydraulic brake pressure control device for a vehicle comprising an input hydraulic pressure chamber in communication with an output port of a master cylinder, and an output hydraulic pressure chamber in communication with a wheel brake to generate a brake hydraulic pressure corresponding to a hydraulic pressure of the input hydraulic pressure chamber, in which when the wheel is about to assume a locked state, a volume of said output hydraulic pressure chamber increases in response to an introduction of a controlled liquid pressure from anti-lock control means to a control chamber, the hydraulic brake pressure control device comprising a casing which includes therein a first cylinder portion, a second cylinder portion in coaxial arrangement with said first cylinder portion and a pillar-like projecting portion which projects into said first cylinder portion, said casing receiving therein a piston comprising a first piston portion slidably fitted in said first cylinder portion, a second piston portion connected to the first piston portion and slidably fitted in said second cylinder portion and a third cylinder portion positioned in the center of said first piston portion and slidably fitted over said projecting portion, and a spring for urging the piston in one direction, said first cylinder portion defining therein said control chamber for exerting a pressing force on said piston in the opposite direction upon introduction of liquid pressure, said first and second cylinder portions defining therein said input hydraulic pressure chamber for exerting a pressing force on said piston in said one direction upon introduction of hydraulic pressure, said third cylinder portion defining therein said output hydraulic pressure chamber for exerting a pressing force on said piston in the opposite direction upon introduction of hydraulic pressure, said piston being provided with an oil passage for communicating the input and output hydraulic pressure chambers and a valve mechanism for closing the oil passage in response to movement of the piston in the opposite direction.

4,929,037

HYDRAULIC ANTI-LOCK BRAKING SYSTEMS FOR VEHICLES

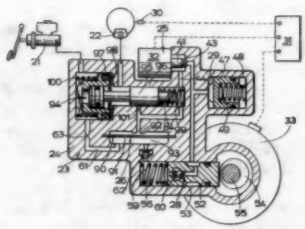
Glyn P. R. Farr, Warwickshire, England, assignor to Lucas Industries public limited company, England

Filed Mar. 2, 1989, Ser. No. 317,937

Claims priority, application United Kingdom, Mar. 9, 1988, 8805598; Jul. 21, 1988, 8817412

Int. Cl.[5] B60T *8/40, 8/48, 8/36*

U.S. Cl. 303—116 **6 Claims**



1. A hydraulic anti-lock braking system for vehicles comprising a master cylinder for applying hydraulic fluid under pressure to a brake on a wheel to apply said brake, a modulator responsive to the behaviour of said braked wheel to modulate the supply of fluid from said master cylinder to said brake in an anti-lock mode, and a pump having an output which generates the energy necessary to recover fluid after the pressure applied to said brake had first been released to prevent said wheel from locking, wherein said modulator comprises means defining a control chamber, a solenoid-operated valve for determining the pressure in said control chamber, a poppet valve for controlling communication between said master cylinder and said brake in accordance with pressure in said control chamber, means defining an expansion chamber to which fluid is relieved from said brake in an anti-lock mode, a re-application valve for determining the rate of re-application of pressure to said brake upon recovery of said braked wheel, and a restricted connection between said master cylinder and said output from said pump, and wherein said poppet valve comprises a means defining a passage, a spool responsive to pressure in said control chamber for controlling the supply of fluid to the brake

through said passage, a valve seating, and a valve head movable relative to said spool and which, in an open position, is normally spaced from said seating to provide unrestricted communication between said master cylinder and said brake, movement of said spool in a direction to open said passage to cause said head to co-operate with the seating to cut-off unrestricted communication between said master cylinder and said brake.

4,929,038

HYDRAULIC UNIT

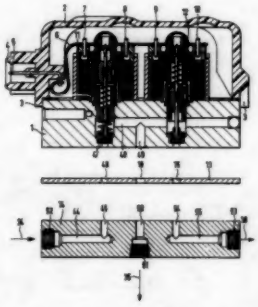
Hans-Dieter Reinartz, Frankfurt am Main, and Helmut Steffes, Hattersheim, both of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed Sep. 1, 1988, Ser. No. 239,487

Claims priority, application Fed. Rep. of Germany, Sep. 2, 1987, 3729216

Int. Cl.[5] F15B *13/08;* **B60T** *8/32;* **B60K** *28/16*

U.S. Cl. 303—119 **21 Claims**



1. A hydraulic unit for a hydraulic braking pressure control device comprising:

at least one standardized valve block having a plurality of electromagnetically operable valves with pressure medium inlets and outlets disposed on an external surface of the valve block at predetermined standardized positions, said pressure medium inlets and outlets interconnected with one another through said valves forming a plurality of valve block fluid flow passages capable of being opened and closed by said valves;

a connection element having an external surface area with pressure medium inlets and outlets disposed thereon at random positions selected as required for a particular control device for connection with other external components of said control device, said pressure medium inlets forming a plurality of connection element fluid flow inlet passages and said pressure medium outlets forming a plurality of connection element fluid flow outlet passages, said inlet passages being separate and independent of said outlet passages;

at least one distributing element having pressure medium channel means for connecting the inlets and outlets of the valve block fluid flow passages with the other external components of the control device through said connection element inlet passages and outlet passages.

4,929,039

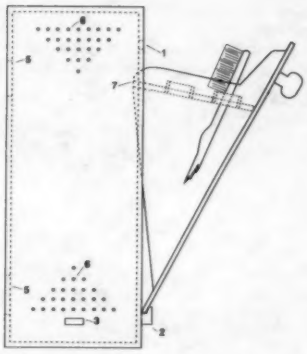
TOOTHBRUSH CABINET FOR HOLDING OF TOOTHBRUSHES AND TOOTHPASTE IN BATHROOM

Paul Thomas, 271 Hanakapiai St., and Lionel M. Ahina, 1096-D Wainiha St., both of Honolulu, Hi. 96825

Filed Nov. 16, 1988, Ser. No. 271,668

Int. Cl.[5] A47B *75/00*

U.S. Cl. 312—213 **1 Claim**



1. A wall mountable cabinet for holding toothbrushes comprising:

A mounting plate having front and rear faces and means for attaching to a wall extending from the rear face and at least two hooks projecting outwardly and upwardly from the front face;

A cabinet having a pair of side walls, a top wall, a bottom wall, a back wall, and a front wall having an opening;

Said back wall having apertures corresponding in number to the number of hooks projecting from the front face of the mounting plate, said hooks and apertures cooperating to support the cabinet;

A pair of upwardly projecting hinge members attached to a lower extremity of the opening in the front wall, said hinge members each having a first horizontal portion and a second rearwardly inclined portion, said hinge members adapted to pivotably support a door;

A door, for closing the open front, said door having a bottom resting on the hinge members, providing means to allow the door to pivot with respect to the cabinet;

Shelf means connected to said door and extending into said cabinet, said shelf having a plurality of upwardly projecting circular lugs that surround apertures and provide structure capable of supporting toothbrushes;

Said shelf means having stop means located at the side opposite the side connected to the door, said stop means adapted to engage the cabinet for stopping the door from pivoting too far;

Said side walls having ventilation openings and a plurality of removable plugs;

And a toothpaste holding receptacle which may be secured to the cabinet after removal of the removable plugs.

4,929,040

FIVE MIRROR, TWO PERPENDICULAR PLANE IMAGE DEROTATOR

Thomas S. Pagano, and RObert R. Turtle, both of Goleta, Calif., assignors to Santa Barbara Research Center, Goleta, Calif.

Filed Sep. 1, 1988, Ser. No. 239,251

Int. Cl.[5] G02B *26/10, 27/64*

U.S. Cl. 350—6.5 **15 Claims**

1. An optical apparatus comprising:

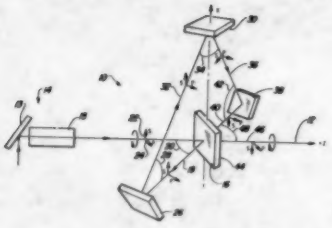
a support means rotatable about an axis;

a first mirror fixedly attached to said support means, wherein said axis is incident upon said first mirror and said first mirror is disposed to receive and reflect an incident beam of light at a first angle;

a second mirror fixedly attached to said support means, said second mirror disposed to receive and reflect, at a second angle, the light that is reflected by the first mirror at a first angle;

a third mirror fixedly attached to said support means, said third mirror disposed to receive and reflect at a third angle, said light that is reflected by the second mirror at a second angle;

a fourth mirror fixedly attached to said support means, said fourth mirror disposed to receive and reflect at a fourth



angle, said light that is reflected by the third mirror at a third angle; and

a fifth mirror fixedly attached to said support means, said fifth mirror disposed to receive and reflect at a fifth angle, said light that is reflected by the fourth mirror at a fourth angle, wherein said fifth mirror is also disposed so that said light that is received at a fifth angle is reflected colinear to the incident beam of light and wherein said mirrors are disposed so that the optical axis of the incident beam and the optical axis of said light that is reflected by said first mirror at a first angle lie in a first plane, and the light that is reflected by the second mirror, the third mirror and the fourth mirror lies in a second plane, and the light that is reflected by said fifth mirror lies in the first plane.

4,929,041

CATHODOLUMINESCENCE SYSTEM FOR USE IN A SCANNING ELECTRON MICROSCOPE INCLUDING MEANS FOR CONTROLLING OPTICAL FIBER APERTURE

Kerry J. Vahala, San Gabriel, and Michael E. Hoenk, Pasadena, both of Calif., assignors to Johnston Pump/General Valve, Inc., Brookshire, Tex.

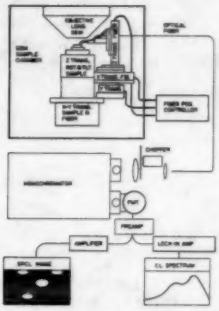
Filed Jan. 9, 1989, Ser. No. 294,234

Int. Cl.[5] G02B *6/00*; G01N *23/00*

U.S. Cl. 350—96.10 **19 Claims**

1. An improved cathodoluminescence light collection system for use in scanning electron microscopes of the type using a scanning electron beam directed through an objective lens into a sample chamber and onto a sample within the chamber; the improvement comprising:

an optical fiber having a light entry aperture positioned between said sample and said objective lens for collecting at least a portion of the cathodoluminescence light emitted by said sample in response to said electron beam; and



means for precisely controlling the position of said aperture relative to said sample from a location outside said chamber.

4,929,042

VARIABLE ACOUSTICAL DEFLECTION OF AN OPTICAL WAVE IN AN OPTICAL WAVEGUIDE

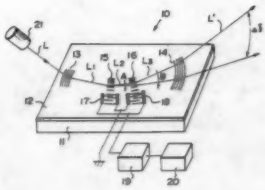
Masami Hatori; Nobuharu Nozaki, and Kozi Kamiyama, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Nov. 27, 1987, Ser. No. 127,020

Claims priority, application Japan, Nov. 28, 1986, 61-283646; Jun. 25, 1987, 62-158612

Int. Cl.[5] G02B *6/10*

U.S. Cl. 350—96.13 **14 Claims**



7. An optical deflecting apparatus comprising:

(i) an optical waveguide formed of a material allowing propagation of surface acoustic waves therethrough,

(ii) a first surface acoustic wave generating means for generating a first surface acoustic wave, which advances in a direction intersecting an optical path of a guided optical wave advancing inside of said optical waveguide and diffracts and deflects said guided optical wave, in said optical waveguide, and

(iii) a second surface acoustic wave generating means for generating a second surface acoustic wave, which advances in a direction intersecting the optical path of said guided and diffracted optical wave and diffracts and deflects said guided and diffracted optical wave in a direction that amplifies the deflection caused by said diffraction, in said optical waveguide,

wherein said first surface acoustic wave generating means and said second surface acoustic wave generating means are operated to continuously change the frequencies of said first surface acoustic wave and said second surface acoustic wave and the directions of advance thereof while satisfying the conditions of

$k1+K1=k2$, and

$k2+K2=k3$

with the angle of deflection of said guided optical wave by said first surface acoustic wave and said second surface acoustic wave being within the range of $\delta 2$ to $\delta 3$ ($\delta 2<\delta 3$), wherein k1 and k2 respectively denote wave vectors of the guided optical wave before and after being diffracted by said first surface acoustic wave, k3 denotes the wave vector of the guided optical wave after being diffracted by said second surface acoustic wave, and K1 and K2 respectively denote wave vectors of said first surface acoustic wave and said second surface acoustic wave, and

in such a range that said deflection angle becomes smaller than $\delta 2$, the operation of said second surface acoustic wave generating means is stopped, and said first surface acoustic wave generating means is operated to continuously deflect said guided optical wave within a deflection angle range of $\delta 1$ to $\delta 2$ ($\delta 1<\delta 2$).

4,929,043

LIGHT BEAM DEFLECTOR

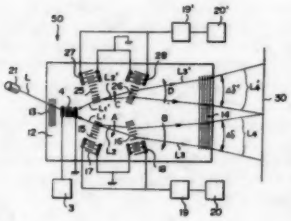
Masami Hatori, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 30, 1989, Ser. No. 358,228

Claims priority, application Japan, May 31, 1988, 63-133738; May 31, 1988, 63-133739

Int. Cl.[5] G02B 6/10

U.S. Cl. 350—96.13 **17 Claims**



5. A light beam deflector comprising:

(i) an optical waveguide made of a material capable of propagating surface elastic waves therethrough and exhibiting electrooptic effects;

(ii) an electrooptic light switch which diffracts a single light beam, which is introduced into the optical waveguide and guided therethrough, and divides it into first and second guided waves, said electrooptic light switch varying an electric field applied to said optical waveguide, which in turn varies the efficiency with which the light beam is diffracted, thereby varying the ratio between the intensities of said first and second guided waves;

(iii) first surface elastic wave generating means for generating in said optical waveguide a first surface elastic wave which travels across the path of the first guided wave travelling in said optical waveguide and thereby diffracts and deflects the first guided wave;

(iv) second surface elastic wave generating means for generating in said optical waveguide a second surface elastic wave which travels across the path of the first guided wave which is diffracted by said first surface elastic wave and thereby diffracts and deflects said second guided wave in a direction which amplifies the deflection of the guided wave due to the diffraction thereof;

(v) third surface elastic wave generating means for generating in said optical waveguide a third surface elastic wave which travels across the path of the second guided wave travelling in said optical waveguide and thereby diffracts and deflects said second guided wave;

(vi) fourth surface elastic wave generating means for generating in said optical waveguide a fourth surface elastic wave which travels across the path of the second guided wave which is diffracted by said third surface elastic wave and thereby diffracts and deflects said second guided wave in a direction which amplifies the deflection of the second guided wave due to the diffraction thereof;

(vii) said first and second surface elastic wave generating means being arranged such that the frequencies and directions of said first and second surface elastic waves may be continuously varied while the following conditions are met:

$$k_1+K_1=k_2$$

$$k_2+K_2=k_3$$

wherein k_1 is the wave vector of the first guided wave before it is diffracted by said first surface elastic wave, k_2 is the wave vector of the first guided wave after it is diffracted by said first surface elastic wave, k_3 is the wave vector of the first guided wave diffracted by said second surface elastic wave, and K_1, K_2 are the wave vectors of said first and second surface elastic waves;

(viii) said third and fourth elastic wave generating means being arranged such that the frequencies and directions of said third and fourth surface elastic waves may be continuously varied while the following conditions are met:

$$k_4+K_3=k_5$$

$$k_5+K_4=k_6$$

where k_4 is the wave vector of the second guided wave before it is diffracted by said third surface elastic wave, k_5 is the wave vector of the second guided wave after it is diffracted by said third surface elastic wave, k_6 is the wave vector of the second guided wave diffracted by said fourth surface elastic wave, and K_3, K_4 are the wave vectors of said third and fourth surface elastic waves; and

(ix) said first, second, third, and fourth surface elastic wave generating means being arranged such that said first and second guided waves emitted from said optical waveguide will scan a surface along respective aligned lines, which lines have ends which are adjacent to each other.

4,929,044

OPTICAL PICKUP USING WAVEGUIDE

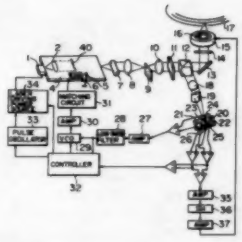
Akira Arimoto, Kodaira, Japan; Sachiko Ishikawa, Braunschweig, Fed. Rep. of Germany, and Keiji Kataoka, Kawagoe, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 13, 1988, Ser. No. 193,594

Claims priority, application Japan, May 13, 1987, 62-114602; Jul. 31, 1987, 62-190038; Sep. 4, 1987, 62-220230

Int. Cl.[5] G02B 6/10

U.S. Cl. 350—96.13 **30 Claims**



1. An optical pickup in which a light deflector element using a surface acoustic wave is provided in a waveguide, and a

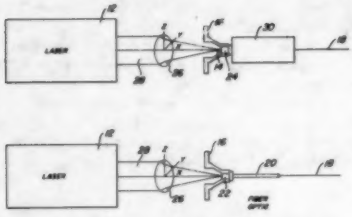
semiconductor laser capable of stably operating in longitudinal modes the number of which is not larger than 5 is disposed in proximity to said waveguide at a distance not larger than 1 μm.

4,929,045

METHOD AND APPARATUS FOR ALIGNING OPTICAL ENERGY TO A WAVE GUIDE

Terry A. Fuller, Highland Park, Ill., assignor to Fuller Research Corporation, Vernon Hills, Ill.

Filed Sep. 29, 1988, Ser. No. 252,171
Int. Cl.[5] G02B 6/42
U.S. Cl. 350—96.15 6 Claims



1. Method of aligning a source of optical energy and a fiber optic, comprising the steps of:

(a) inserting an optical detector into a holder,

(b) illuminating the optical detector by a source of optical energy to cause the detector to generate an output representative of intensity of illumination incident on the detector,

(c) moving a selected one of the source and holder to a position in which the output of the detector corresponds to maximum intensity of illumination,

(d) maintaining the moved one of the source and holder in said position and

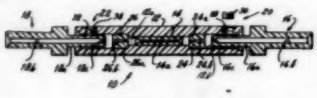
(e) replacing the optical detector by a fiber optic to be aligned.

4,929,046

REMATEABLE FIBER OPTIC SPLICE

Robert W. Barlow, P.O. Box 133, Canton, Pa. 17724

Filed Feb. 1, 1989, Ser. No. 305,350
Int. Cl.[5] G02B 6/38
U.S. Cl. 350—96.21 5 Claims



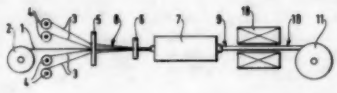
1. A fiber optic, rematerable splice assembly comprising: an elongated housing; a flexible, fiber receiving and positioning unit centrally located within said housing; first and second slidably removable, cylindrical ferrules, one within each end of said housing; and holding means associated with said housing for releasably maintaining said ferrules within said housing, said cylindrical ferrules being rotatable within said elongated housing when said holding means are disengaged, said rotation having no effect upon the transverse placement of said ferrules within said ends.

4,929,047

METHOD OF MANUFACTURING AN OPTICAL FIBER CABLE AND A CABLE OBTAINED BY THE METHOD

Patrick Dubots, Neauphle Le Chateau; Denis Legat, Lisses, and Raymond Vic, Soulages Bonneval, all of France, assignors to Societe Anonyme dite: Compagnie Generale D'Electricite, Paris, France

Filed Oct. 17, 1988, Ser. No. 258,411
Claims priority, application France, Oct. 16, 1987, 87 14285
Int. Cl.[5] G02B 5/16; B32B 17/00
U.S. Cl. 350—96.23 11 Claims



1. A method of manufacturing a cable comprising an assembly of at least one optical fiber and metal reinforcing elements extending parallel to said fiber, said assembly being coated with a coating of plastic material, the method including the improvements whereby:

strands having a diameter of between 0.06 mm and 0.5 mm and constituted by elementary metal filaments are selected for the reinforcing elements;

the optical fiber is coated with a substance preventing it from subsequently adhering to said plastic coating material;

said fiber is placed between a plurality of strands parallel with said fiber to form a bundle of component parts;

the bundle formed in this way is passed through a set of successive combs and dies in order to bring the component parts of said bundle closer together while maintaining a degree of longitudinal traction on said components; and

a resin is deposited on said bundle by electrostatic powdering, and is then melted by passing through an oven at a temperature of less than 250 degrees C. for about 1 minute to form said plastic coating and solidified to encapsulate said bundle.

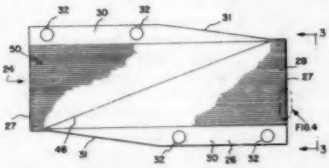
8. A cable obtained by the method of claim 1, wherein a diameter of the cable lies in a range 0.5 mm to 1 mm.

4,929,048

FIBER OPTIC DISPLAY

Michel J. Cuypers, Longmont, Colo., assignor to Fiberview Corporation, Boulder, Colo.

Filed Nov. 10, 1988, Ser. No. 271,234
Int. Cl.[5] G02B 6/04
U.S. Cl. 350—96.24 8 Claims



1. In a fiber optic display of the type comprising an array of optical fibers arranged in a matrix having a plurality of rows, each row having a plurality of discrete optical fibers, wherein said array of optical fibers has first and second ends, the improvement comprising:

a plurality of spacers, each spacer defining an array of parallel grooves on one side thereof, each of said grooves sized to receive a respective one of said optical fibers such that the grooves of each spacer receive the optical fibers of a

respective one of the rows, each of said grooves separated by a land having a width such that adjacent optical fibers in each row are laterally separated from one another by a distance no less than the width of the respective land;

said optical fibers secured in said grooves with no more than one optical fiber in each groove such that the grooves position the optical fibers precisely with respect to one another in each row;

said spacers secured together in aligned registration to form a surface aligned with the first ends of the optical fibers;

said surface positioned at an acute angle with respect to said grooves such that the first ends are elongated in a direction extending along the rows.

4,929,049

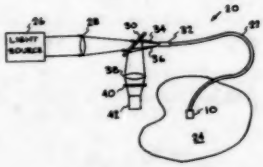
FIBER OPTIC REFRACTIVE INDEX SENSOR USING A METAL CLAD

Donald Le Goullon, Tracy, and Kisboloy Goswami, Walnut Creek, both of Calif., assignors to FiberChem, Inc., Las Vegas, Nev.

Filed Jan. 29, 1988, Ser. No. 150,197

Int. Cl.[5] G02B *6/16*

U.S. Cl. 350—96.29 **21 Claims**



1. A fiber optic sensor for differentiating solvents of different refractive index, comprising:

a fiber optic core;

a thin film metal clad made of a material selected from platinum, rhodium and palladium formed on and surrounding the fiber optic core of a thickness which modulates the transmission of light through the fiber optic core as a function of the refractive index of a surrounding solvent.

4,929,050

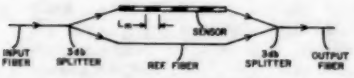
TRAVELING WAVE FIBER OPTIC INTERFEROMETRIC SENSOR AND METHOD OF POLARIZATION POLING FIBER OPTIC

Mark L. Wilson, Vadnais Heights, Minn., assignor to Unisys Corporation, Blue Bell, Pa.

Filed Oct. 31, 1988, Ser. No. 264,915

Int. Cl.[5] G02B *6/02*; G01B *9/02*; G01D *5/34*; B05D *5/06*

U.S. Cl. 250—227.17 **32 Claims**



PVF_2 EM SENSOR

1. A fiber optic sensing element comprising an optical light conducting fiber and a stress sensitive coating over a periodic group of substantially equal length segments of said fiber, wherein each of said segments are separated by equal uncoated segments of substantially the same length as said coated segments.

9. A method of polarization poling of an optical fiber having a polarizable stress-sensitive coating over at least a portion of the total length of said fiber comprising the steps of

(a) winding a predetermined length of said fiber on a hollow spool which has a circumference that is substantially equal to one wavelength of a light source that is to be coupled to said fiber,

(b) wrapping a metallic foil on said wrapped fiber on said spool,

(c) grounding said foil to a reference ground,

(d) placing a generally D-shaped electrically-conductive electrode having a flat surface and a curved surface in the hollow inside of said spool so that the curved surface of said electrode is adjacent said fiber around substantially half of the inner circumference of said spool,

(e) heating said electrode until said fiber reaches a temperature in the range of 50° C. to 70° C.,

(f) applying a voltage to said electrode to provide a sufficiently intense electrical field to polarize said stress-sensitive coating, and

(g) terminating said heating and the application of said voltage.

4,929,051

OPTICAL GLASS FIBER WITH A PRIMARY COATING OF ORGANO-POLYSILOXANES CONTAINING ACRYLIC ACID ESTER GROUPS

Wolfgang Rogler, Erlangen; Christian Weitemeyer, Essen; Dietmar Wewers, Bottrop; Frederic Zapf, and Bernhard Stapp, both of Erlangen, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

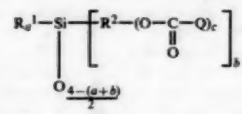
Filed Mar. 25, 1988, Ser. No. 173,271

Claims priority, application Fed. Rep. of Germany, Mar. 27, 1987, 3710240

Int. Cl.[5] G02B *6/10*

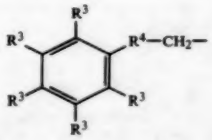
U.S. Cl. 350—96.30 **5 Claims**

1. An optical glass fiber with a primary coating of cured organopolysiloxane wherein the pre-cured organopolysiloxane contains acrylic acid ester groups, has alkyl or aryl groups or mixtures thereof bound to silicon, is liquid at the temperature of its application to the fiber, is polymerizable with high-energy radiation, and said organopolysiloxane has the formula



wherein:

R^1 is alkyl with 1 to 4 carbon atoms or phenyl or aralkyl of the following structure or mixtures thereof:



wherein

R^3 is at least one of hydrogen, alkyl with 1 to 12 carbon atoms and halogen, and

R^4 being a linear-chain or branched alkylene with 1 to 8 carbon atoms,

R^2 is a linear-chain, branched, or cyclic alkylene residue with 1 to 20 carbon atoms, which is unsubstituted or substituted by oxyalkylene units, phenylene groups, acrylic acid or methacrylic acid residues, and

Q is one of the following esters which is bound to the carbon atom of a carbonyloxy group through the oxygen atom of

a hydroxyl group of said ester, less the hydrogen atom thereof:

(i) a (meth-)acrylate of a diol with 1 to 10 carbon atoms or its oxyalkylene derivatives with 1 to 10 oxyalkylene units, or

(ii) a multi-acrylate or methacrylate of a polyol selected from the group of pentaerythritol, trimethylolethane, trimethylolpropane, and glycerin or a dimer or oxyalkylene derivative thereof with a total of 1 to 10 units of at least one of oxyethylene and oxypropylene units;

a is 1.6 to 2.2; b is 0.001 to 1.6; a plus b is less than or equal to 3, and c is 1to 4.

4,929,052

FLEXIBLE GUIDES FOR INFRA-RED ENERGY

Michael J. Colles, and George R. Smith, both of Edinburg, Scotland, assignors to Medical Laser Uit of Heriot-Watt University of Research Park, Edinburgh, Scotland

Filed Mar. 16, 1988, Ser. No. 168,897

Claims priority, application United Kingdom, Feb. 17, 1988, 8803620

Int. Cl.[5] G02B *6/20*

U.S. Cl. 350—96.32 **7 Claims**

1. An infra-red energy guide having a relatively long overall length, said guide comprising a plurality of infra-red energy guide sections which are individually short relative to said overall length, each said guide section being substantially rigid and having an energy-guiding internal section, guide section mounting means mounting said guide sections in a concatenation with each guide section aligned to project infra-red energy into the succeeding guide section in the concatenation, said guide section mounting means providing an angular deviatinn between adjacent guide sections in said concatination, said angular deviation being such that said infra-red energy guide is transmissive of infra-red energy along its overall length, wherein the adjacent ends of each adjacent pair of said infra-red energy guide sections are externally overlapped by a respective length of outer tubing having ann inner surface with an internal diameter slightly greater than the external dimensions of said guide sections, the length and internal diameter of each said length of outer tubing permitting the respective overlapped guide sections to undergo a variable mutual angular deviation that can increase until said guide sections jam against the inner surface of the respective length of outer tubing to prevent a further increase in said mutual angular deviation.

4,929,053

DISPLAY UNIT AND OPTICAL WAVEGUIDE FOR USE IN SAME

Friedrich Müller-Stute, Neumünster, and Günter Weil, Asslar, both of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 23, 1989, Ser. No. 301,004

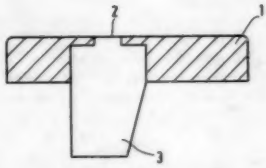
Claims priority, application Fed. Rep. of Germany, Feb. 1, 1988, 3802868

Int. Cl.[5] G02B *6/00*; H05B *33/00*

U.S. Cl. 350—96.34 **4 Claims**

1. An optical waveguide formed of a material consisting essentially of a polycarbonate, a quantity of titanium dioxide sufficient to disperse transmitted light but less than that at which no light is transmitted and a fluorescent, light-converting organic dye.

2. A display unit comprising an optical waveguide (3), said waveguide being formed of a material consisting essentially of



a polycarbonate, titanium dioxide in an amount sufficiently high to disperse transmitted light but less than a quantity at which no light is transmitted and a fluorescent, light-converting organic dye.

4,929,054

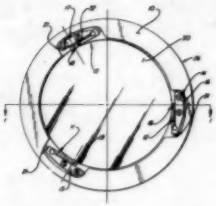
MOUNTING FOR HIGH RESOLUTION PROJECTION LENSES

Anees Ahmad, Bethel, and Richard L. Huse, Norwalk, both of Conn., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

Continuation-in-part of Ser. No. 856,882, Apr. 28, 1986, abandoned. This application Oct. 3, 1986, Ser. No. 914,953

Int. Cl.[5] G02B *7/02*

U.S. Cl. 350—252 **2 Claims**



1. A lens mount comprising:

a lens having a first surface of spherical configuration and a second surface;

a lens cell having a top surface, a bottom surface, an outer diameter and an inner diameter;

said outer diameter being concentric about an axis of rotation of said lens cell;

said top surface and said bottom surface being substantially perpendicular to said axis of rotation;

a lens seat projecting inwardly from said inner diameter;

said lens seat having a radius of curvature match-mated to the curvature of said first surface of said lens;

the rotational symmetry axis of said lens seat being coincident with the axis of rotation of said lens cell;

the first surface of said lens being substantially in contact with said lens seat;

the optical axis of said second surface being aligned substantially coincident with the axis of rotation of said lens cell;

a plurality of flexures holding said lens to said lens cell;

each of said flexures being removably attached to said lens cell;

each of said flexures comprising:

a flexure assembly attached to said lens cell;

a flexure arm attached at both ends to said flexure assembly and at its center to said lens; and

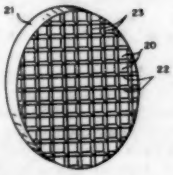
said flexure arm being substantially parallel to and spaced from said flexure assembly.

4,929,055

ANTI-REFLECTION TECHNIQUE

Peter W. J. Jones, 70 Oakley Rd., Belmont, Mass. 02178

Filed Sep. 19, 1988, Ser. No. 246,436
Int. Cl.[5] G02B *27/00*
U.S. Cl. 350—276 R 22 Claims



1. A structure for reducing reflections from a light reflective surface of an optical device having a field of view with an aspect ratio, said structure comprising:

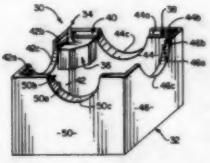
a plurality of substantially tubular elements, each having an aspect ratio, mounted in front of said reflective surface, the aspect ratio of each of said tubular elements having a selected relationship with respect to the aspect ratio of the field of view of said optical device to substantially reduce said reflections.

4,929,056

APPARATUS FOR OPENING AND HOLDING A FRAME AND A METHOD OF MOUNTING AN OPTICAL ELEMENT IN A FRAME

Kenneth G. Leib, Wantagh, and Edward V. Sullivan, Huntington Station, both of N.Y., assignors to Grumman Aerospace Corporation

Filed Sep. 8, 1988, Ser. No. 241,593
Int. Cl.[5] G02B *27/00*
U.S. Cl. 350—321 21 Claims



1. Apparatus for opening and holding a frame of the type that is flexible between open and closed positions and that forms an opening, the apparatus comprising:

a mounting member defining a seating surface adapted to seat against the frame; and

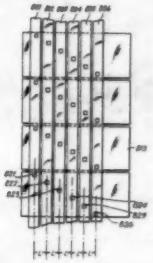
an expansion member connected to the mounting member, and adapted to extend into the opening of the frame to force the frame into the open position, and to hold the frame in the open position when the frame is seated on the mounting member.

4,929,057

LIQUID CRYSTAL OPTICAL DEVICE

Kenji Aoki; Katsumori Takei; Haruo Nakamura, and Yoshikazu Matsushita, all of Suwa, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan

Continuation of Ser. No. 159,453, Feb. 18, 1988, abandoned, which is a continuation of Ser. No. 947,796, Dec. 30, 1986, abandoned, which is a continuation of Ser. No. 838,876, Mar. 10, 1986, Pat. No. 4,671,616, which is a continuation of Ser. No. 733,400, May 13, 1985, abandoned, which is a continuation of Ser. No. 368,323, Apr. 14, 1982, abandoned. This application Jun. 12, 1989, Ser. No. 366,228
Claims priority, application Japan, Apr. 15, 1981, 56-56418
The portion of the term of this patent subsequent to Jun. 9, 2004, has been disclaimed.
Int. Cl.[5] G02F *1/13;* G09G *3/02*
U.S. Cl. 350—333 4 Claims



1. A liquid crystal optical device for operation in a time-sharing manner to transmit light to a moving photosensitive surface, the liquid crystal device comprising:

liquid crystal cell means formed from a first transparent plate means and a cooperating second transparent plate means;

a plurality of N common electrode means disposed in spaced, parallel strips on the interior surface of the first transparent plate means to provide a plurality of M spaced regions for forming light micro-shutters;

a plurality of M cooperating signal electrode means disposed on the interior surface of the second transparent plate means substantially orthogonal to the common electrode means and in registration with the micro-shutter forming regions thereof and extending in a direction substantially parallel to the moving photosensitive surface, both N and M being integers, the transparent plate means being spaced apart from and substantially parallel to each other for forming a space therebetween and the transparent plate means being disposed so that the respective electrode means cross in plan view;

opaque means including transparent regions for defining micro-shutters located where the respective electrode means cross, there being M transparent regions diagonally offset from each other across the width of the signal electrode means and with respect to the crossed common electrode means, the transparent regions repeating along the signal electrode means at each crossing common electrode means so that the micro-shutters are disposed in a diagonal line which is substantially transverse to the direction of motion of an associated photosensitive surface, there being intervals of $L=(m+1/N)T_1v$ between the centers of adjacent transparent regions of adjacent common electrodes, wherein v is the speed of transfer of the photo-sensitive surface, T_1 is a writing period, and m is an integer equal to or greater than 2;

liquid crystal means encapsulated in the space between the transparent plate means; and

time sharing liquid crystal driving circuit means coupled to

the N common and M signal electrode means for applying signals to the electrode means which optically switch the light micro-shutters, whereby transmission of light through the liquid crystal is stopped.

4,929,058

METHOD FOR DRIVING A DISPLAY DEVICE

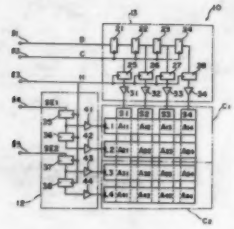
Takaji Numao, Tenri, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

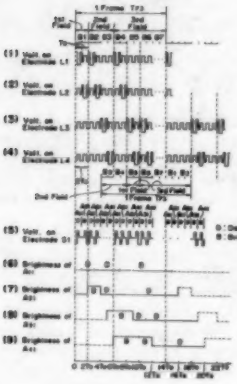
Filed Aug. 30, 1988, Ser. No. 238,257

Claims priority, application Japan, Aug. 31, 1987, 62-218477

Int. Cl.[5] G02F *1/13*; G09G *3/36*

U.S. Cl. 350—333 **6 Claims**





1. A method for driving a liquid crystal display device comprised of a matrix of columns and row electrodes intersecting with each other, and forming a display picture element at each point of intersection between said column and row electrodes, each said display picture element adapted to be selectively set in one of bright and dark memory states so as to achieve a desired multi-gradation display, the driving method comprising the steps of:

(1) dividing, to achieve a multi-gradation display of 2^n levels (n being an integer not smaller than 3), the row electrodes into K groups of row electrodes wherein K is an integer not smaller than 2 and has the following relationship,

$$K \leq \frac{(2^n - 1)}{n};$$

(2) defining the number Z of row electrode lines in each group of the row electrodes, wherein y represents the total number of row electrodes and Z is a positive integer and has the following relationship,

$$Z \geq \frac{Y}{K};$$

(3) defining one frame period T_F, composed of $(2^n - 1)$ time blocks, to have the following relationship,

$$T_F = (2^n - 1)\, ZT_0,$$

wherein T_0 represents the selection time during which the picture elements on each of the row electrodes are selectively set in one of the bright and dark memory states;

(4) sequentially selecting each one of said K groups of the row electrodes, during a time width ZT_0 defining each of the time blocks, such that each picture element in the selected one of the groups of the row electrodes can be set in one of the bright and dark memory states according to a predetermined selection signal; and

(5) selecting a number of time blocks, not smaller than n, that the K groups of the row electrodes, during each one-frame period T_F, will reset each picture element according to said predetermined signal wherein each predetermined selection signal for each of said K groups, is determined such that each of said K groups will operate so as to reset picture elements during different of said time blocks, said selected number of time blocks being equal for each of said K groups, thereby allowing for an efficient multi-gradation display device.

4,929,059

NON-LINEAR ELEMENT FOR LIQUID CRYSTAL DISPLAYS

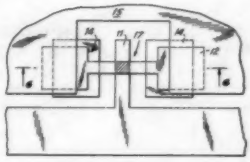
Kotoyoshi Takahashi, Suwa, Japan, assignor to Seiko Epson Corporation, Tokyo, Japan

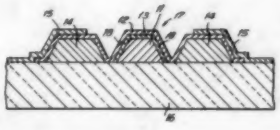
Filed Dec. 9, 1988, Ser. No. 282,239

Claims priority, application Japan, Dec. 10, 1987, 62-312608; Sep. 19, 1988, 63-234023

Int. Cl.[5] G02F *1/13*

U.S. Cl. 350—334 **9 Claims**





9. A non-linear element forming on a substrate comprising a first electric conductor formed on said substrate, said first electric conductor formed as an island having a first side and a second side opposed to said first side, a protective layer formed on said substrate adjacent said first side and said second side of said island being out of electrical contact with said island, the protective layer being formed as a second island and a third island, an insulator formed on said first electric conductor, a second electric conductor formed on said insulator forming a laminate of said second electric conductor, insulator and first

electric conductor, and extending to adhere to said second island and third island, said protective layer preventing said second electrode from disconnecting from said substrate.

4,929,060

COLOR LIQUID CRYSTAL DISPLAY DEVICE

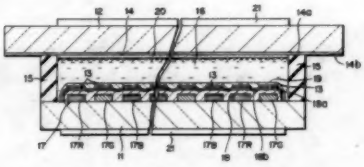
Naoshige Sugimoto, Hino; Tetsushi Yoshida, Hachioji, and Tadahisa Toyama, Fussa, all of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

Filed May 4, 1988, Ser. No. 190,100

Claims priority, application Japan, May 6, 1987, 62-66760[U]; Apr. 28, 1988, 63-106539

Int. Cl.[5] G02F *1/133*

U.S. Cl. 350—339 F **20 Claims**



1. A color liquid crystal display device for displaying an image, comprising:

first and second substrates facing each other;

a color filter comprised of three types of filters associated with primary colors of red, green and blue, formed on that surface of said first substrate which faces said second substrate, so that different color filters are arranged in a predetermined order;

a first insulative film formed over said color filter and made of a substantially transparent organic material;

a second insulative film formed over said first insulative film and made of a substantially transparent inorganic material;

a plurality of first electrodes formed on said second insulative film in association with the three types of filters that comprise said color filter, and made of a substantially transparent conductive material;

a plurality of second electrodes formed on that surface of said second substrate which faces said first substrate in such a manner as to face at least one of said first electrodes and made of a conductive material;

a first aligning film formed over said first electrodes and said second insulative film, for arranging liquid crystal molecules adjacent to the surface of the second insulative film in a predetermined direction;

a second aligning film formed over said second electrodes and said second substrate, for arranging liquid crystal molecules adjacent to the surface of the second substrate which faces the first substrate in a predetermined direction;

liquid crystal disposed between said first and said second aligning films so that molecules of the liquid crystal are twisted substantially by 90 degrees between the first and the second aligning films; and

a pair of polarizing means provided on both sides of an exterior of said liquid crystal and arranged so that polarizing axes of the polarizing means are parallel to one another;

wherein a number of small regions between the first and the second electrodes form a number of pixels which are normally set in a light shielded state, and the light transmission state of the pixels can be controlled to display a desired image.

4,929,061

COLOR LIQUID CRYSTAL DISPLAY DEVICE

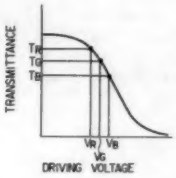
Mamoru Tominaga, Kawagoe; Naoyuki Kokado; Katsuhiro Gonpei, both of Yokohama; Hisami Nira, and Akira Taya, both of Kawasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Jul. 5, 1988, Ser. No. 215,172

Claims priority, application Japan, Oct. 29, 1987, 62-271757

Int. Cl.[5] G02F *1/133*

U.S. Cl. 350—338 **9 Claims**



1. A color liquid crystal display device for displaying a color image comprising:

a back light unit having

a light source,

at least one reflective plane, and

a diffusion plate; and

a liquid crystal panel disposed adjacent the back light unit and receiving light from the back light unit, the liquid crystal panel having a plurality of pixels aligned horizontally in rows and vertically in columns, each of the pixels including at least three pixel components each corresponding to a different primary color, and

a plurality of liquid crystal shutters each corresponding to one of the pixel components for controlling transmission of light from the back light unit to the pixel components of each of the pixels in response to a driving voltage such that spectral transmittances of the liquid crystal shutters corresponding to each of the pixels are set initially to a substantially equal value to produce a reference white visual output.

4,929,062

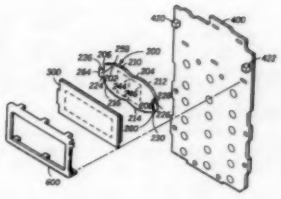
LIGHT GUIDE FOR LCD

Andrzej T. Guzik, Pompano Beach; James H. Curtis, Coral Springs; Faris S. Habbaba, Boca Raton, and Kirit Shah, Coral Springs, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Nov. 2, 1988, Ser. No. 265,977

Int. Cl.[5] G02F *1/13*

U.S. Cl. 350—345 **5 Claims**



1. A liquid crystal display system, comprising in combination:

a liquid crystal display;

two surface mounted light sources, and

a light guide having a display surface positioned behind said

liquid crystal display, said light guide is made from a slab of transparent plastic material substantially uniform in thickness having a front surface adjacent said crystal liquid display, a rear surface, and six bordering surfaces perpendicular to said front and rear surface, two of the bordering surfaces are substantially mutually parallel and are located at opposite ends of the slab, the other four bordering surfaces are substantially arcuate in shape, said rear surface has two rectangular plane depressions;

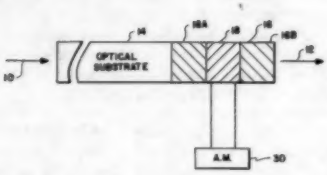
two generally half barrel shaped concave extensions, positioned over said light sources, being carried by said ends for receiving light emitted by said light sources, substantially perpendicular to the light guide and directing it into said light guide, said arcuate bordering surface, said rear surface, and said depressed planes including the means for reflecting light.

4,929,063

NONLINEAR TUNABLE OPTICAL BANDPASS FILTER

William W. Durand, Edina, and Ronald E. Peterson, Shoreview, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 22, 1986, Ser. No. 821,291
Int. Cl.[5] G02B *5/28*; G02F *1/23*, *1/01*
U.S. Cl. 350—353 **3 Claims**



1. A tunable Fabry-Perot filter comprising:

a substrate;

a first coating on said substrate;

a second coating on said first coating, the second coating having activatable nonlinear optical properties and an optical thickness of one-half of the design transmittance wavelengths at ambient temperatures and wherein the second coating comprises silver sulfide;

a third coating on said second coating wherein the first and third coatings include material selected from the group consisting of thallium chloride and silver chloride; and

activation means for changing the optical properties of said second coating so as to tune the filter to a desired wavelength.

4,929,064

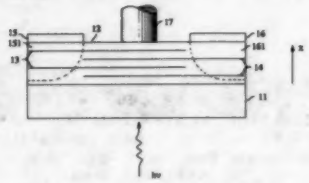
OPTICAL COMMUNICATIONS MODULATOR DEVICE

Erdmann F. Schubert, New Providence, N.J., assignor to American Telephone and Telegraph Company, New York, N.Y.

Filed Jul. 21, 1988, Ser. No. 222,603
Int. Cl.[5] G02F *1/015*
U.S. Cl. 350—355 **10 Claims**

1. In an optical communications system, a modulator device comprising a substrate-supported semiconductor structure,

said structure comprising a semiconductor material comprising a first plurality of p-type regions commonly contacted by a first contact, and a second plurality of n-type regions commonly contacted by a second contact, said first plurality of regions being interleaved with said second plurality of regions, and



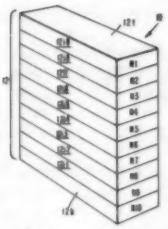
the thickness of said regions being less than the spatial extent of the lowest subband corresponding to a V-shaped potential well.

4,929,065

GLASS PLATE FUSION FOR MACRO-GRADIENT REFRACTIVE INDEX MATERIALS

James J. Hagerty, Saratoga, and David N. Pulsifer, Mountain View, both of Calif., assignors to ISOTEC Partners, Ltd., Tucson, Ariz.

Filed Nov. 3, 1988, Ser. No. 266,670
Int. Cl.[5] G02B *5/00*
U.S. Cl. 350—413 **16 Claims**



1. A process for fabricating a glass member having a varying index of refraction along an optic axis comprising

(a) stacking a plurality of intermediate glass plates between a top plate and a bottom plate to form an assembly, said top plate comprising a glass of a first composition having a first selected index of refraction and a first softening temperature and said bottom plate comprising a glass of a second composition having a second selected index of refraction and a second softening temperature, said plurality of intermediate glass plates each comprising a composition intermediate that of said top and bottom plates and stacked to achieve a change in composition varying from said first composition to said second composition;

(b) heating said assembly to a fusion temperature to fuse said plates to form a fused assembly; and

(c) cooling said fused assembly to room temperature.

4,929,066

TELECENTRIC IMAGE-FORMING OPTICAL SYSTEM FOR LARGE IMAGE SIZE

Zenji Wakimoto, and Takahisa Hayashi, both of kyoto, Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Japan

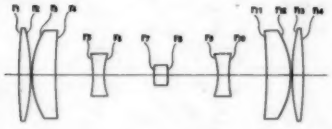
Filed Jul. 14, 1988, Ser. No. 219,552
Claims priority, application Japan, Jul. 14, 1987, 62-176808
Int. Cl.[5] G02B *13/22*, *9/64*
U.S. Cl. 350—415 **15 Claims**

1. A telecentric image-forming optical system comprising:

a first lens group including a first double-convex lens, either a meniscus or plano-convex lens whose convex surface is

directed to an object, and a double-concave lens arranged in order from an object side of said system;

a second lens group including a double-concave lens, either a meniscus or plano-convex lens whose convex surface is directed to an image, and a second double convex lens arranged in order from an image side of said system; and



a third double-convex lens disposed between said first and second lens groups;

wherein the secondary focal point of the first lens group and the principal focal point of the second lens group substantially coincides with each other at the third double-convex lens or in the vicinity of the third double-convex lens.

4,929,067

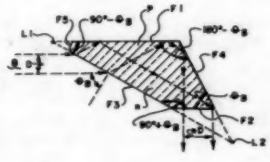
METHOD AND APPARATUS FOR ANAMORPHICALLY SHAPING AND DEFLECTING ELECTROMAGNETIC BEAMS

Ingolf Sander, Cuputino, Calif., assignor to Verbatim Corporation, Sunnyvale, Calif.

Filed Jan. 3, 1989, Ser. No. 292,720

Int. Cl.[5] G02B *13/10, 13/08*

U.S. Cl. 350—421 **4 Claims**



1. A method for anamorphically shaping a beam of radiation and for deflecting such beam by 90°, said method comprising the steps of

(a) providing a prism of radiation-transmissive material, said prism having at least four lateral faces, two of said faces being parallel to each other, and the other two of said faces being nonparallel and arranged to define, in cooperation with said parallel faces, internal angles of Θ_B, $90°+\Theta_B$, $90°-\Theta_B$ and $180°-\Theta_B$, where Θ_B is the intended angle of incidence of the beam on said prism, and

(b) arranging said prism in such beam so that the beam enters the prism through one of said nonparallel faces from a direction parallel to said parallel faces, said lateral faces being arranged with respect to each other so that the beam, upon entering the prism, is refracted toward one of said parallel faces, undergoes double internal reflection, first from said one of said parallel faces and then from the other of said nonparallel faces, and emerges from said prism through said perpendicular to the other of said parallel faces.

4,929,068

CONVERSION LENS

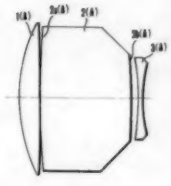
Sadahiko Tsuji, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

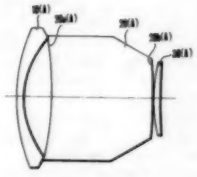
Continuation of Ser. No. 89,750, Aug. 27, 1987, abandoned. This application Sep. 21, 1989, Ser. No. 411,203

Claims priority, application Japan, Sep. 1, 1986, 61-205644; Sep. 1, 1986, 61-205645; Sep. 1, 1986, 61-205646; Sep. 1, 1986, 61-205647; Sep. 1, 1986, 61-205648; Sep. 1, 1986, 61-205649

Int. Cl.[5] G02B *15/02, 13/18, 9/12, 9/60*

U.S. Cl. 350—422 **17 Claims**





1. A conversion lens comprising, from front to rear:

a first lens unit or group made of glass material;

a second lens unit or group made of plastic material; and

a third lens unit or group made of glass material said lens units or groups being separated from each other with at least a partial air space therebetween.

4,929,069

ZOOM LENS

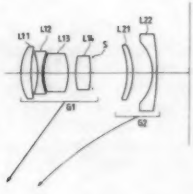
Atsushi Shibayama, Kawasaki, Japan, assignor to Nikon Corporation, Tokyo, Japan

Filed Sep. 5, 1989, Ser. No. 403,173

Claims priority, application Japan, Sep. 9, 1988, 63-225959

Int. Cl.[5] G02B *15/14*

U.S. Cl. 350—423 **15 Claims**



1. A compact zoom lens provided with a first lens group G1 of a positive refractive power and a second lens group G2 of a negative refractive power and adapted for performing a zooming operation by varying the air gap between said lens groups;

wherein said first lens group G1 comprises, in the order from the object side, a positive meniscus lens component L11

with faces convex to the object side, a biconcave lens component L12, a biconvex lens component L13, and a positive lens component L14;

said second lens group G2 comprises, in the order from the object side, a positive meniscus lens component L21 with faces convex to the image side, and a negative meniscus lens component L22 with faces concave to the object side; and

said lens components L11, L12, L13, L14, L21 and L22 satisfy following conditions (1) to (5);

$$0.49 < K/f_w < 0.7 \quad (1)$$

$$-12 < \frac{r_b + r_a}{r_b - r_a} < -3.4 \quad (2)$$

$$0.075 < D_{21}/f_w < 0.170 \quad (3)$$

$$1.25 < \frac{r_d + r_c}{r_d - r_c} < 1.80 \quad (4)$$

$$-0.13 < n_{21} - n_{22} < 0.06 \quad (5)$$

wherein

K: $d_{12}n_{12}+d_{13}n_{13}+d_{14}+D_{12}+D_{13}$

d_{12}: axial thickness of biconcave lens component L_{12};

d_{13}: axial thickness of biconvex lens component L_{13};

d_{14}: axial thickness of positive lens component L_{14};

n_{12}: refractive index of biconcave lens component L_{12};

n_{13}: refractive index of biconvex lens component L_{13};

n_{14}: refractive index of positive lens component L_{14};

D_{12}: axial air gap between biconcave lens component L_{12} and biconvex lens component L_{13};

D_{13}: axial air gap between biconvex lens component L_{13} and positive lens component L_{14};

f_w: focal length of entire system at wide angle end;

r_a: radius of curvature of the face, closest to the object, of the positive meniscus lens component L_{21} of the second lens group;

r_b: radius of curvature of the face, closest to the image, of positive meniscus lens component L_{21} in the second lens group;

D_{21}: axial air gap between positive meniscus lens component L_{21} and negative meniscus lens component L_{22} in the second lens group;

r_c: radius of curvature of the face, closest to the object, of negative meniscus lens component L_{22} of the second lens group;

r_d: radius of curvature of the face, closest to the image, of negative meniscus lens component L_{22} of the second lens group;

n_{21}: refractive index of positive meniscus lens component L_{21} of the second lens group; and

n_{22}: refractive index of negative meniscus lens component L_{22} of the second lens group.

4,929,070

ILLUMINATION OPTICAL SYSTEM FOR ENDOSCOPES

Akira Yokota, and Masao Kuga, both of Hachiouji, Japan, assignors to Olympus Optical Co. Ltd., Tokyo, Japan

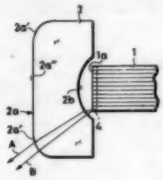
Continuation of Ser. No. 729,354, May 1, 1985, abandoned. This application Nov. 17, 1988, Ser. No. 273,714

Claims priority, application Japan, May 2, 1984, 59-089129

Int. Cl.[5] G02B *3/00, 6/00*

U.S. Cl. 350—432 **20 Claims**

1. An illumination optical system for endoscopes comprising a fiber bundle having an exit end face and emitting light from said exit end face and a cover lens arranged in front of the exit end face of said fiber bundle so that the light emitted from the exit end face of said fiber bundle is irradiated toward an object to be observed by an endoscope in order to illuminate the object to be observed by the endoscope through said cover lens, said cover lens consisting of at most two lens elements arranged along an optical axis of said illumination optical system, each of said at most two lens elements being composed of an inhomogeneous medium in which the refractive index of a peripheral part distant from the optical axis of said illumination optical system is larger than that of a center part close to



the optical axis, wherein said cover lens has negative refractive power as a whole and each of said at most two lens elements is provided with a convex spherical surface, toward the object, on the side of the object.

4,929,071

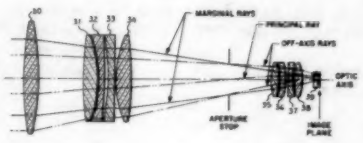
LONG-FOCUS COLOR-CORRECTED PETZVAL-TYPE OPTICAL OBJECTIVE

Romeo I. Mercado, San Jose, Calif., assignor to Lockheed Missiles & Space Company, Inc., Sunnyvale, Calif.

Filed Dec. 20, 1985, Ser. No. 811,848

Int. Cl.[5] G02B *9/00*

U.S. Cl. 350—463 **14 Claims**



1. A optical objective of net positive dioptric power, said objective having an image plane at which four discrete wavelength come to a common focus, said optical objective comprising:

(a) a first lens group consisting of five lens elements,

(b) a second lens group consisting of four lens elements, and

(c) a field flattener consisting of one lens element,

all of said lens elements being disposed along an optic axis, each of said lens elements being rotationally symmetric with respect to said optic axis, said second group of lens elements being separated from said first group of lens elements along said optic axis by an aperture stop, said field flattener being located adjacent said image plane, said lens elements being made from only two different optical glasses, at least one of said lens elements being made from a first one of said optical glasses, at least one other of said lens elements being made from a second one of said optical glasses.

4,929,072

SELF CLEANING MIRROR FOR A VEHICLE

Naofumi Fujie, Nagoya; Tomoaki Imaizumi, Hoi; Koji Ito, Kariya, and Shoji Okada, Toyota, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Jul. 31, 1989, Ser. No. 386,703

Claims priority, application Japan, Jul. 30, 1988, 63-190967

Int. Cl.[5] G02B *5/10*

U.S. Cl. 350—582 **9 Claims**

8. A self-cleaning mirror for a vehicle comprising:

a mirror of predetermined curvature,

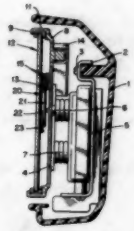
an electric control means, and

an ultrasonic vibrator joined to a rear surface of said mirror

and electrically connected to said control means, said ultrasonic vibrator including:

a vibratory element,

first and second electrode terminals mounted on first and second sides, respectively, of said vibratory element, each



electrode terminal including a projecting connecting portion connected to a lead wire from said control means, and

a molding material occupying a space between a rear side of said mirror and a terminal defined by a connection between said connecting portion and lead wire, said molding material suppressing vibration of said connecting portions.

4,929,073

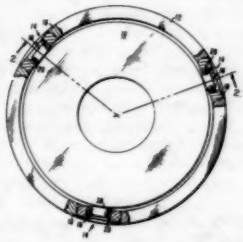
KINEMATIC MOUNT

John A. La Plante, Winchester, Mass., and Robert D. Schaefer, Huntington Beach, Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Continuation of Ser. No. 664,442, Oct. 24, 1984, abandoned. This application Apr. 12, 1988, Ser. No. 183,353

Int. Cl.[5] G02B *5/08*

U.S. Cl. 350—609 **13 Claims**



1. A coupling between a support and an element having a center and lying generally in a plane within the support for relieving any stresses between the element and the support and any distortions on the element, comprising:

first means having both a sliding engagement with the support for movement in the element plane towards and away from the element center, and a spherical surface centered within a plane which is normal to the element plane; and

second means coupled to the element and provided with a spherical surface in engagement with said first means spherical surface,

said spherical surfaces being so arranged that one of said surfaces resides within the other of said surfaces.

4,929,074

MIRROR AND BRACKET ASSEMBLY

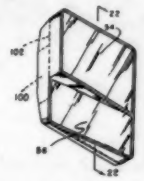
Milfred W. Urban, 1819 N. Edwards, Wichita, Kans. 67203

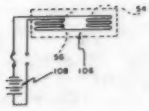
Filed Oct. 24, 1988, Ser. No. 261,749

The portion of the term of this patent subsequent to Dec. 29, 2004, has been disclaimed.

Int. Cl.[5] G02B *5/08*

U.S. Cl. 350—625 **4 Claims**





4. A break-away rearview mirror comprising a mirror housing means; a remote control means having a movable face for moving mirrors and mounted within said housing means, said remote control means being controlled remotely manually; a backing means secured to the face; a bonding means with a predetermined setting time positioned on top of said backing means whereby when said bonding means sets, it sets into an elastic, rubbery solid; a flat mirror of unitary magnification disposed against said backing means and bonded thereto by said bonding means after the same has solidified; a convex mirror optically pre-aligned disposed against said backing means bonded thereto by said bonding means after the same has solidified; said bonding means adapted upon solidifications to provide a cushion effect for the flat mirror and the convex mirror against the backing means to prevent the mirror from breaking or becoming misaligned in the event the mirror housing is dropped or jarred; said backing means having a structure defining a flat portion whereupon the flat mirror is supported and a triangular portion whereupon the convex mirror is supported.

4,929,075

OPTICAL VIEWING SYSTEM

Isaac Eliakim, 23 Omri Street, Tel-Aviv, Israel

Continuation of Ser. No. 63,314, Jun. 18, 1987, abandoned. This application Jul. 31, 1989, Ser. No. 387,443

Claims priority, application Israel, Jun. 18, 1986, 79139

Int. Cl.[5] G02C *1/00*; G02B *25/00*

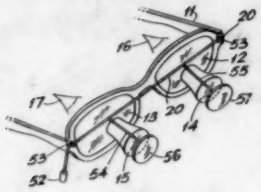
U.S. Cl. 351—158 **7 Claims**

1. An optical spectacle-type device for use by persons suffering from substantial deficiencies of sight, comprising:

a conventional spectacle frame equipped with corrective optical lenses, correcting the acuity of vision, each lens having an inner surface and an outer surface with the inner surfaces of the lenses being positionable adjacent an eye of the person;

a telescopic lens system being attached in front of each lens to the outer surface of said lens, said telescopic lenses focused at a common focus at a predetermined distance from the spectacle frame to provide a sharp vision at a first distance from the viewer; and

a further frame being hingedly attached to said spectacle frame, said further frame having two prismatic lenses and a lever to move the two prismatic lenses in front of the telescopic systems to change the focal length of the entire



system to provide a sharp vision at a second distance from the viewer, said lever also serving to remove the two prismatic lenses from in front of each of the telescopic systems so that a sharp vision is again provided at the first distance from the viewer.

4,929,076

OPHTHALMIC MEASURING APPARATUS

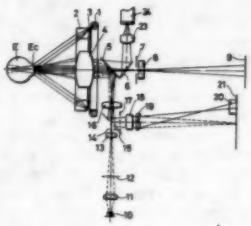
Takashi Masuda, Kawasaki, and Kyoji Sekiguchi, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 96,260, Sep. 8, 1987, abandoned, which is a continuation of Ser. No. 808,883, Dec. 13, 1985, abandoned, which is a continuation-in-part of Ser. No. 580,813, Feb. 16, 1984, abandoned. This application Apr. 24, 1989, Ser. No. 342,708

Claims priority, application Japan, Jun. 13, 1983, 58-105593; Feb. 9, 1985, 60-23727

Int. Cl.[5] A61B *3/10*

U.S. Cl. 351—212 **2 Claims**



1. An ophthalmic measuring apparatus capable of both measuring the cornea shape and eye refractive power of an eye to be examined, comprising:

(a) a cornea shape measuring system, having:

(a1) a projecting optical system for projecting a target image onto the cornea of the eye to be examined,

(a2) an imaging optical system for reproducing an image of the target reflected at the cornea, and

(a3) light detecting means for detecting the reflected target image to measure the shape of the cornea,

(b) a refractive power measuring system, having:

(b1) a projection optical system for projecting a target image onto the fundus of the eye to be examined,

(b2) an imaging optical system for reproducing a target image reflected by the fundus of the eye, wherein at least a part of the optical path of each of said imaging optical systems is shared by the other of said imaging optical systems, and

(b3) light detecting means for detecting the reflected target image to measure the eye refractive power, and

(c) a fixation chart projecting system, having:

(c1) first fixation chart means for fixing the gazing axis of the eye during the measurement of the shape of the cornea of the eye,

(c2) second fixation chart means for fixing the gazing axis of the eye during the measurement of the refractive power of the eye, and

(c3) driving means for shifting a part of said fixation chart projecting system so that said first fixation chart means is projected from a position corresponding to the refractive power of the eye measured by said refractive power measuring system.

4,929,077

INTERFEROMETRIC RANGE FINDER

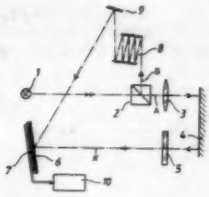
André Huisen, Lichingen, Switzerland, assignor to Wild Leitz AG, Switzerland

Filed Mar. 22, 1988, Ser. No. 171,715

Claims priority, application Switzerland, Mar. 24, 1987, 1113/87

Int. Cl.[5] G01B *9/02*

U.S. Cl. 356—4.5 **13 Claims**



1. A range finder for accurately measuring distances, the combination comprising a time partially coherent source means for producing a beam of electromagnetic waves, beam splitter means for splitting said beam from said source into a reference beam and a measuring beam, means defining a reference path for said reference beam, means defining a measuring path for said measuring beam, said measuring path defining means including means to focus said measuring beam onto and to reflect said measuring beam off of a testpiece, position sensitive detector array means, said reference path means and said measuring path means including means to bring said reference beam and said measuring beam into interference with each other and to cause said two beams to be superimposed over at least one zone of path differences between said reference and said measuring beams, whereby a direct determination of the coherence of said two beams can be made based on the intensity distribution of the interferences of said beams on said array means, and program controlled signal processing means for evaluating said intensity distribution, whereby distances concerning the location of said testpiece can be accurately derived by said signal processing means.

4,929,078

CONVERSION OF DUAL WAVE BEAM SPECTROPHOTOMETER TO DUAL WAVELENGTH SPECTROPHOTOMETER

Harold J. Harmon, Edmond, Okla., assignor to Oklahoma State University, Stillwater, Okla.

Continuation-in-part of Ser. No. 35,963, Apr. 8, 1987, abandoned. This application Nov. 10, 1988, Ser. No. 269,964

Int. Cl.[5] G01J *3/427*

U.S. Cl. 356—320 **15 Claims**

1. A retrofit conversion means for converting a dual beam spectrophotometer having a sample cycle and a reference cycle to a dual wavelength spectrophotometer, where the dual beam spectrophotometer has a first light source for generating

a first beam of light of preselected wavelength, first and second optical paths, a detector means, synchronous means for cyclically alternating said first beam between said first and second optical paths, and sample and reference receiving means disposed in said first and second optical paths respectively, said retrofit conversion means comprising:

a. a second light source for generating a second beam of light of a preselected second wavelength;

b. means for transmitting said second beam from said source to said first optical path;

c. means for injecting said second beam into said first optical path during the reference cycle with the first beam from the first light source and the injected beam from the second light source cyclically transmitted along said first optical path to said sample; and,

d. means for blocking the second optical path and preventing transmission of light therethrough.

4,929,079

OPTICAL GRANULOMETRY PROCESS AND DEVICES FOR BROAD MEASURING RANGES

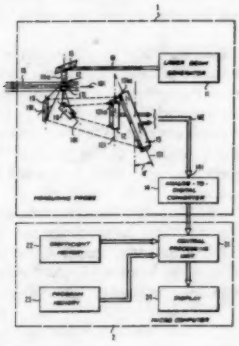
André Delfour, Ramonville; Francois Falempin, St Michel Sur Orge; Jacques Isbert, Toulouse, and Claude Sans, Massy, all of France, assignors to Office Nationl D'Etudes Et De Recherches Aerospatiales styled O.N.E.R.A, Chatillon, France

Filed Jul. 11, 1988, Ser. No. 217,737

Claims priority, application France, Jul. 10, 1987, 87 09785

Int. Cl.[5] G01N *15/02*

U.S. Cl. 356—336 **12 Claims**



1. A process of evaluating a size distribution of particles in a fluid from measurements of scattered radiation along predetermined spacial directions in a finished integral number P by a sample of said fluid illuminated by an incident light beam, said process comprising:

from a radiation measuring vector having, as components, mean radiations along said P directions determined after several successive measurements and from a matrix of theoretical radiation coefficients, calculating a first estimation of said distribution expressed by a first discrete distribution function contained in a mathematical envelope function of predetermined type and respectively fixing concentration values at size nodes for which said first function is defined, said size nodes being distributed thereby satisfying a recursive relation of predetermined type,

determining by an iterative calculation involving digital filterings an optimum recursive relation to which the nodes of a discrete distribution function should satisfy, said determining step being performed in response to said first function being taken as starting data, whereby said discrete distribution function nodes are distributed in such a way that said discrete distribution function offers maximum correlation with a discrete measurement uncertainty function resulting from several successive radiation measurements in said P directions, and then calculating from said radiation measuring vector and said matrix all the discrete distribution functions compatible with said measurement uncertainties, the nodes of which satisfy said optimum recursive relation, thereby deducing an optimum statistical evaluation of said size distribution.

4,929,080

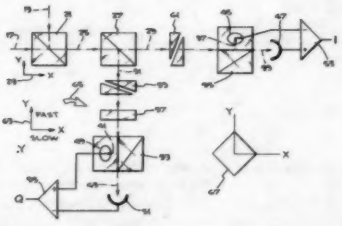
APPARATUS FOR THE OPTICAL MEASUREMENT OF SPECTRA DISTRIBUTION

Herschel Burstyn, Plainsboro, N.J., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Filed May 16, 1988, Ser. No. 194,391

Int. Cl.[5] G01B *9/02*

U.S. Cl. 356—338 **10 Claims**



1. Apparatus for measuring scattered light from a sample comprising:

a. means for generating a monochromatic beam of light along a first optical path;

b. first beam splitting means positioned along said first path for splitting said monochromatic beam of light along a second and third optical path;

c. means carrying a sample interposed in said optical path which produces a scattered beam of light after said second optical path passes therethrough, said beam on said second and third optical paths being, respectively, linearly polarized and perpendicular one to the other;

d. beam combining means for receiving beams on said second and third optical paths for combining the same on to a single path;

e. non polarized first beam splitting beams oriented along said single path emanating from said beam combining means along a fourth and fifth optical path;

f. second beam splitting means oriented along said fourth optical path for receiving the beam along said fourth optical path and for splitting the beam along a sixth and seventh optical path, said second beam splitting means being polarized;

g. third beam splitting means oriented along said fifth optical path for receiving the beam along said fifth optical path and for splitting the same along an eighth and ninth optical path, said third beam splitting means being polarized and;

h. beam retardation means interposed between at least one of said fourth and fifth optical paths for shifting the relative phase between the orthonormal polarization components

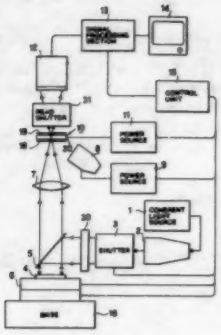
of the light beam travelling along said optical path substantially ninety degrees as it passes through said beam retardation means.

4,929,081

SYSTEM FOR DETECTING DEFECTS IN A REGULARLY ARRANGED PATTERN SUCH AS AN INTEGRATED CIRCUIT OR THE LIKE

Yoko Yamamoto; Hitoshi Tanaka, and Noboru Mikami, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 161,089, Feb. 26, 1988, abandoned.
This application Oct. 13, 1989, Ser. No. 423,551
Claims priority, application Japan, Feb. 27, 1987, 62-45631
Int. Cl.[5] G01B 9/02
U.S. Cl. 356—354 8 Claims



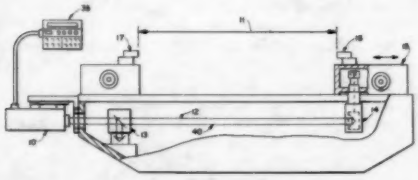
1. A pattern defect detecting system for an integrated circuit device or the like, for detecting defects or foreign matter on a regularly arranged test pattern on a test sample by spatially filtering diffracted light from the test sample obtained by using a coherent light beam impinging on said test sample, said pattern defect detecting system having a spatial filtering means which includes an optical space element including a polarizing means and being capable of receiving and erasably recording therein a selected filter pattern including a diffraction image of said regularly arranged test pattern projected by said coherent light beam in real-time operation and erasing said selected filter pattern in real-time operation, said erasably recorded diffraction image providing a filter characteristic for the direct filtering of diffracted light from said coherent light beam.

4,929,082

LASER LINEAR DISTANCE MEASUREMENT SYSTEM AND APPARATUS

George B. Webber, Rocky River, Ohio, assignor to Webber Gage Division of L.S.

Filed Jul. 13, 1988, Ser. No. 218,624
Int. Cl.[5] G01B 9/02
U.S. Cl. 356—358 5 Claims



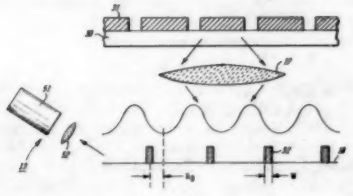
1. A linear measurement system having a laser generating source directing a first laser beam to an interferometer and thence to a retroreflector, said retroreflector adapted to move on a surface to be measured, optical reflecting means carried by a pendulum mounted within a mounting for the retroreflector adapted to reflect a laser beam directed parallel to the said first beam through the linear measuring interferometer to the laser generating source.

4,929,083

FOCUS AND OVERLAY CHARACTERIZATION AND OPTIMIZATION FOR PHOTOLITHOGRAPHIC EXPOSURE

Timothy A. Brunner, Palo Alto, Calif., assignor to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 876,316, Jun. 19, 1986, abandoned.
This application Mar. 20, 1989, Ser. No. 326,482
Int. Cl.[5] G01B 11/00; G01J 1/00
U.S. Cl. 356—400 6 Claims



1. In combination with a photolithographic exposure tool having a reticle platen, a wafer stage, a light source for illuminating said platen, and imaging optics disposed between said reticle platen and said wafer stage; the improvement comprising

a calibration wafer mounted on said wafer stage, said wafer having a plurality of test dies positioned at different locations thereon, each of said test dies being patterned to have a checkerboard-like array of periodic, mutually orthogonal gratings oriented to align along an x-axis and a y-axis of said exposure tool, the gratings on said test dies having a predetermined spatial frequency and a predetermined duty ratio;

a calibration mask mounted on said reticle platen, said mask being imaged onto said calibration wafer by said imaging optics to produce an aerial image of said mask, said mask being patterned to have a checkerboard-like array of periodic, mutually orthogonal gratings oriented to aling along the x-axis and the y-axis of said exposure tool, the aerial image of said mask gratings having a spatial frequency and a duty ratio which are essentially equal to and substantially greater than said predetermined spatial frequency and said predetermined duty ratio, respectively;

a single photodetector positioned to produce an electrical output signal in response to light angularly radiated from said test dies; and

means for scanning one after another of said test dies transversely with respect to the aerial image of said mask gratings, first along one of said axis and then along the other of said axis;

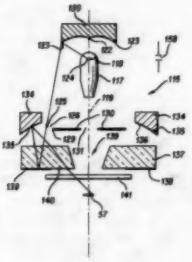
whereby the output signal of said photodetector varies over time to provide an x-y scanned representation of the aerial image of said mask gratings at each of said test die locations.

4,929,084

MEASURING HEAD

Fred Mast, Wil, and Jean A. Knus, Zurich, both of Switzerland, assignors to GRETAG Aktiengesellschaft, Regensdorf, Switzerland

Filed Jan. 24, 1989, Ser. No. 300,936
Claims priority, application Switzerland, Feb. 2, 1988, 360/88
Int. Cl.[5] G01N *21/27, 21/47;* G01J *3/10*
U.S. Cl. 356—446 **13 Claims**



1. Measuring head for an apparatus to determine photographic data comprising:

a light source;

an optical projection means to illuminate a measuring spot on a measuring surface;

a spherical annular mirror;

a flat annular mirror applied to a glass ring;

an optical measuring means; and,

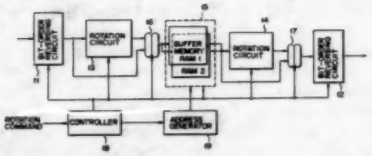
a rotationally symmetrical, aspherical mirror coordinated with the source of light, said aspherical mirror being provided, on a side facing the light source, with an annular groove having a cross-sectional configuration of an elliptical segment of an ellipse, a first focal point of which coincides with a location of the light source on the axis of rotational symmetry of the asperical mirror, and a second focal point of which is located laterally offset relative to the axis of rotational symmetry of the aspherical mirror, in an annular diaphragm surrounded by the spherical annular mirror.

4,929,085

IMAGE DATA ROTATION PROCESSING METHOD AND APPARATUS THEREFOR

Shigehiro Kajihara, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 24, 1987, Ser. No. 100,713
Claims priority, application Japan, Sep. 30, 1986, 61-231717; Nov. 29, 1986, 61-284518
Int. Cl.[5] G06F *15/40, 15/626*
U.S. Cl. 364—518 **14 Claims**



1. A rotation processing system capable of continuously rotating input data, comprising:

buffer means, including first and second memory means and responsive to a first instruction, for sequentially receiving a series of first words, the series of first words being raster-scanned data and each first work includes n data bits, where $n \geqq 2$, for sequentially storing the series of first words in said first memory means in a first direction in units of n data bits, for sequentially reading out a series of second words from said second memory means in a second direction in units of n data bits to obtain a series of second words, each second word including n data bits, while the series of first words is being stored in said first memory means, the second direction being orthogonal to the first direction, and for switching the functions of said first and second memory means when a predetermined number of first words is stored in said first memory means;

first matrix conversion means, connected to said buffer means and responsive to a second instruction, for selectively passing the series of second words and for selectively receiving the series of second words from said buffer means, for holding the series of second words in the received order in units of n second words, and for sequentially outputting n data bits of each of said n second words held therein, one by one in a designated bit order to obtain a series of third words, in an input raster mode;

first bit-order reversing means, connected to said first matrix conversion means and responsive to a third instruction, for selectively passing one of the series of second words and the series of the third words, and for selectively receiving one of the series of second words and the series of the third words to reverse the bit order of each received word to obtain a series of rotated words such that ith bit data of each received word is $(n-i)$th bit data of each respective rotated word, in the input raster mode; and

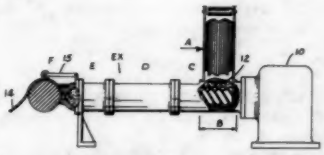
control means, connected to said buffer means, said first matrix conversion means, and said first bit-order reversing means and responsive to an input rotation command, for selectively setting the input raster mode, for generating the first to third instructions, and for outputting the first instruction to said buffer means, the second instruction to said first matrix conversion means, and the third instruction to said first bit-order reversing means so that the rotation processing system operates in a pipelined manner.

4,929,086

CONTINUOUS RATE FEED HOPPER

Paul Geyer, 15660 Tacoma, Detroit, Mich. 48025

Filed May 4, 1989, Ser. No. 347,118
Int. Cl.[5] B28C *7/04;* B29B *1/06*
U.S. Cl. 366—76 **12 Claims**



1. An apparatus for the continuous feeding, at a uniform rate, of rubber like polymer in the form of standard bales or in multiple strip form of know weight per unit length and chemical additives, into a continuous mixing machine having a hopper, a multi-purpose hopper rotor and a hopper barrel, said hopper having a feed throat communicating with said hopper rotor which is rotatably mounted in the hopper barrel; first means operable to advance the said polymer at an exact uniform preset rate, in relation to the mixing machine rotor speed, capable of firmly clamping the polymer with adequate pressure to force the polymer into said hopper rotor without change of feed rate; second means including said multi-purpose hopper rotor consisting of helical grooves or groove formed by helical ridges provided with, at their outer portion, multiple longitudinal and radial knives, arranged to cut strips of polymer from said incoming bales; third means including an opening in said

barrel before or at the said bale cutting operation, to provide an entrance for the chemical additives, in a manner which tends to coat the freshly cut surfaces of the polymer with the additives, to initiate the mixing action; and fourth means integral with said rotor and said helical grooves, to cause excess extrusion capacity to create turbulence flow to initiate mixing, develop pressure and to transport the process material at a continuous and uniform rate downstream and into the entrance of a rotor and barrel type mixing machine.

4,929,087

METHOD FOR APPLYING VIBRATIONS TO A RESILIENT SUPPORT AND APPARATUS FOR PUTTING THIS METHOD INTO PRACTICE

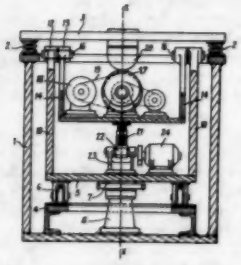
Roger Brigolle, Heulecourt, France, assignor to Societe Anonyme des Machines Osborn, France

Filed Apr. 2, 1987, Ser. No. 33,148

Claims priority, application France, Apr. 2, 1986, 86 04681

Int. Cl.[5] B01F *11/00*; B22C *15/10*

U.S. Cl. 366—111 **4 Claims**



1. A method for applying multidirectiional vibrations to a resilient support, which comprises the steps of:

(a) securing said resilient support against rotation in its plane,

(b) applying to the resilient support unidirectional vibrations from a unidirectional vibration generator,

(c) simultaneously with step (b) rotating said unidirectional vibration generator in a plane parallel to the plane of said resilient support, and

(d) simultaneously with steps (b) and (c) pivoting said unidirectional vibration generator in a plane perpendicular to the plane of said resilient support.

4,929,088

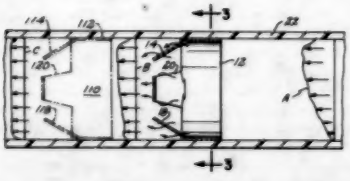
STATIC FLUID FLOW MIXING APPARATUS

Charles R. Smith, Bethlehem, Pa., assignor to Vortab Corporation, Englwood Cliff, N.J.

Continuation-in-part of Ser. No. 224,690, Jul. 27, 1988. This application Jun. 6, 1989, Ser. No. 360,037

Int. Cl.[5] B01F *5/00*

U.S. Cl. 366—337 **19 Claims**



1. A static mixing device adapted to be inserted in a fluid stream having a main flow direction with respect to at least one bounding surface, comprising:

at least two tabs projecting from said at least one bounding surface and inclined in the flow direction at a preselected elevation to said bounding surface, said tabs being spaced apart in a direction transverse to said flow direction, the length (L), width (W) and elevation angle being selected so as to generate pairs of oppositely rotating, predominantly streamwise vortices at the tips of each tab.

4,929,089

APPARATUS FOR MEASURING TEMPERATURES INDICATIVE OF THERMAL CONDUCTIVITY

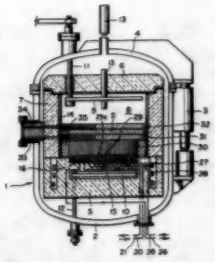
Yoshiki Tsuchida, Tokyo, Japan, assignor to Ishikawajima-Harima Heavy Industries Co., Tokyo, Japan

Filed Jan. 18, 1989, Ser. No. 298,052

Claims priority, application Japan, Jan. 18, 1988, 63-4310; Jan. 18, 1988, 63-7803; Jan. 18, 1988, 63-7804; Jan. 28, 1988, 63-18172; Feb. 19, 1988, 63-21100; Feb. 19, 1988, 63-21101

Int. Cl.[5] G01K *17/00*; G01N *25/18*

U.S. Cl. 374—44 **15 Claims**



1. An apparatus for measuring thermal conductivity of a specimen, said specimen defining a first and a second surface and a periphery, said apparatus comprising:

(a) a measuring chamber adiabatically enclosing an inner space, said measuring chamber containing the specimen and being maintained in contact with the lateral peripheral surface of the specimen to be measured;

(b) a heat source for uniformly heating the first surface of the specimen;

(c) a first thermometer to measure the temperature of the first surface of the specimen;

(d) a heat flow measuring means disposed in contact with the second surface of the specimen in said second space, for maintaining the temperature of the second surface of the specimen at a predetermined temperature and for measuring the thermal energy flowing through the second surface; and

(e) a second thermometer for measuring the temperature of the second surface of the specimen;

by which means creating a constant heat flow through the specimen from the first surface of the specimen, through the specimen, and then through the second surface of the specimen, the direction of said constant heat flow defining an axial orientation;

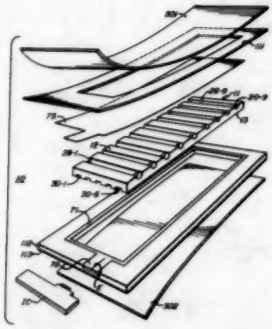
and measuring the temperature of the first and the second surface of the specimen and thermal energy flowing through the specimen, from which said temperatures and thermal energy the thermal conductivity of the specimen can be determined.

4,929,090

TEMPERATURE HISTORY INDICATIANG LABEL

Isabelle Grahm, 2157 N. Vine Ave., No. 4, Hollywood, Calif. 90068

Filed Oct. 24, 1988, Ser. No. 261,588
Int. Cl.[5] G01K *3/04*; G04F *13/04*
U.S. Cl. 374—102 **10 Claims**



1. An indicating label for indicating temperature history with time, comprising:

an electrically insulative panel of substantially planar configuration characterized by a first and second surface on the opposing sides thereof, said first surface including a plurality of first elongate grooves aligned along a first direction thereon, said second surface including a plurality of second elongate grooves aligned along a second direction thereon, said first and second grooves being formed to intersecting depths whereby a corresponding opening is formed in said panel at each intersection of said first and second grooves;

a plurality of first electrode strips conformed for corresponding receipt in said first grooves;

a plurality of second electrode strips conformed for corresponding receipt in said grooves;

a plurality of electrolyte layers deposited in said second recesses in electric contact between the corresponding ones of said first and second electrodes, said electrolyte layers being of a chemical composition selected to consume said first electrodes in the course of producing electrical current; and

switching means operatively connected between said first and second electrodes including corresponding temperature responsive contacts in circuit with respective ones of said second electrodes for completing an electrical circuit with the respective ones of said second electrodes at predetermined levels of temperature.

4,929,091

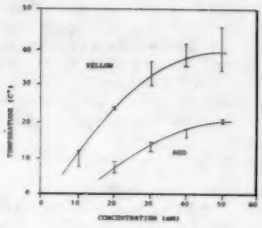
THERMOCHROMIC PLATINUM COMPLEXES

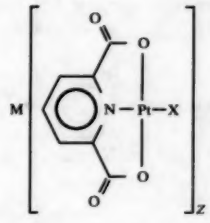
Nenad M. Kostic, and Xin-Ying Zhou, both of Ames, Iowa, assignors to Iowa State University Research Foundation, Inc., Ames, Iowa

Division of Ser. No. 202,456, Jun. 6, 1988, Pat. No. 4,857,231. This application Mar. 27, 1989, Ser. No. 329,405
Int. Cl.[5] G01K *11/00*; C07D *279/00, 285/00*
U.S. Cl. 374—162 **1 Claim**

1. A method of sensing temperature change, comprising:

(a) preparing an aqueous solution of a thermochromic platinum(II) complex of the formula:





wherein M is a cation, X is a halide, and Z is a whole number equal to the positive charge of M;

(b) placing said aqueous solution in an environment in which the complex is monomeric and yellow in solution at a given temperature, but is red and a polymeric at a different temperature;

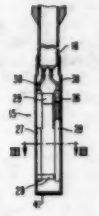
(c) observing the color of said thermochromic complex to determine whether a particular "alert temperature" or a particular temperature range has been reached or passed.

4,929,092

RESISTANCE TEMPERATURE DETECTOR

Seizo Taguchi; Toshiharu Oketani; Michihiro Ohashi; Hideaki Tanaka, all of Kobe, and Hiroshi Terao, Akashi, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo and Kabushiki Kaisha Okazaki Seisakusho, Hyogo, both of, Japan

Filed May 25, 1988, Ser. No. 198,495
Claims priority, application Japan, Jun. 12, 1987, 62-145313; Sep. 16, 1987, 62-140002[U]
Int. Cl.[5] H01C *7/02*
U.S. Cl. 374—183 **14 Claims**



1. A resistance temperature detector for measuring the temperature of a fluid flow, comprising:

a thin-walled tubular case having a first closed end;

a sheath cable assembly secured to a second end of said tubular case to thereby define a sealed vacant space within said case;

normal and backup temperature sensing resistance elements secured in spaced circumferential relation directly to the inner annular wall of said case within said sealed vacant space, said resistance elements being secured to the inner wall of said case with an inorganic adhesive; and

a plurality of insulated lead wires extending between and electrically connecting said normal resistance element and said cable assembly, and extending between and electrically connecting said backup resistance element and said cable assembly.

4,929,093

FIRE DETECTOR HAVING A PROTECTIVE COVER

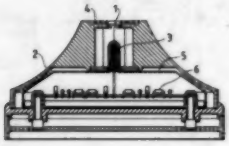
Takashi Suzuki, and Hideto Amemiya, both of Tokyo, Japan, assignors to Nittan Company

Filed Jan. 23, 1989, Ser. No. 299,449

Claims priority, application Japan, Feb. 2, 1988, 63-12163

Int. Cl.[5] G08B *17/00;* **G01K** *7/18, 7/22, 1/08*

U.S. Cl. 374—208 **6 Claims**



1. A fire detector for detecting a fire occurrence, comprising:

a temperature sensor for sensing a temperature increase due to a fire, and

a protective cover for enclosing said temperature sensor and protecting said temperature sensor from external impacts said fire detector further comprising electrical circuits for converting into a sensing signal a temperature signal from said temperature sensor, and a shield case containing said electric circuits therein, thereby to eliminate the effects of external electrical noises and said shield case being electrically connected to said protective cover.

4,929,094

PORTABLE, INSULATED STORAGE CONTAINER

Dawn M. Becker, Byron, Calif., assignor to Bye, Moms Inc., San Francisco, Calif.

Filed Jun. 22, 1989, Ser. No. 369,868

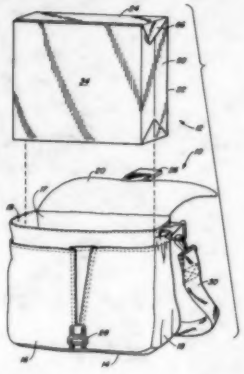
Int. Cl.[5] B65D *33/06, 33/16*

U.S. Cl. 383—7 **10 Claims**

1. A portable, insulated, storage container comprising, in combination:

a bag having interconnected bag bottom, side, and end walls defining an interior and a cover connected to at least one of said bag walls and moveable between a first position whereat said cover closes said interior and a second position whereat said cover does not close said interior; and

a receptacle adapted for insertion into said bag interior, said receptacle having a body portion including bottom, side, and end walls having a configuration generally corresponding to the configuration of said bag interior whereby said receptacle body portion is in engagement with said bag bottom, side, and end walls when said receptacle is disposed in said bag interior, and said receptacle further including a closure portion integral with said body portion to selectively open and close said receptacle, said closure portion including a first primary flap hingedly connected to a first body portion side wall, along a first fold line, a second primary flap hingedly connected along a second fold line to a second body portion side wall in spaced opposition to said first body portion side wall, and manually graspable end flap structure comprising a plurality of interconnected auxiliary flaps disposed between said first and second primary flaps and extending from opposed receptacle body portion end walls, said first and second primary flaps being in at least partially overlapping relationship when said receptacle is closed by said closure portion, and said end flap structure projecting outwardly beyond said body portion end walls when said primary flaps are in said at least partially overlapping relationship.



4,929,095

BALL RETAINER OF A LINEAR GUIDE APPARATUS

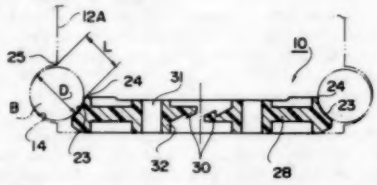
Nobuyuki Osawa, Takasaki, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed May 26, 1989, Ser. No. 357,482

Claims priority, application Japan, May 31, 1988, 63-72338[U]

Int. Cl.[5] F16C *29/06*

U.S. Cl. 384—45 **2 Claims**



1. A ball retainer used with a linear guide apparatus, wherein said linear guide apparatus includes an axially extending guide rail and has ball rolling grooves formed in both corner edges between an upper surface and both side surfaces, a slider mounted on said guide rail and movable in an axial direction and having ball rolling grooves formed in an inner surface at positions respectively opposing the ball rolling grooves of said guide rail, and a plurality of balls mounted in mutually opposing ball rolling grooves of said guide rail and said slider, said ball retainer comprising:

a rectangular substantially flat frame-shaped main portion;

supporting portions protruding axially from opposite ends of said main portion;

side frame portions respectively having ball holding grooves of an arcuate cross section formed in outer side surfaces thereof, said ball holding grooves extending axially over an overall length of said frame portions, said side frame portions having a wall thickness and a width which allows

said side frame portions to deflect inwardly in a curved shape by elastic deformations by an external force applied thereto; and

hook portions respectively protruding inwardly from intermediate positions of the overall length of said side frame portions to normally oppose each other with a predetermined interval therebetween, said hook portions being releasably engageable with each other by deflection of said side frame portions inwardly in a curved shape to hold the deflected state of said side frame portions.

4,929,096

LINEAR GUIDE APPARATUS

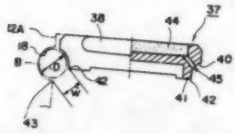
Nobuyuki Osawa, Takasaki, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed May 26, 1989, Ser. No. 358,543

Claims priority, application Japan, May 31, 1988, 63-72337[U]

Int. Cl.[5] F16C *29/06*

U.S. Cl. 384—45 **3 Claims**



1. In a linear guide apparatus including a guide rail having axially extending upper ball rolling grooves formed in both edge portions between an upper surface and both side surfaces, and lower ball rolling grooves formed in both side surfaces, a slider main body mounted on said guide rail and movable in the axial direction and having upper and lower ball rolling grooves formed in an inner surface at positions respectively corresponding to the upper and lower ball rolling grooves of said guide rail, a pair of end caps respectively attached to opposite ends of said slider main body and having supporting holes formed therein, a plurality of balls inserted in the corresponding ball rolling grooves of said guide rail and said slider main body, and ball retainer means for holding the balls in the upper and lower ball rolling grooves of said slider main body,

the improvement comprising:

said ball retainer means comprises an upper ball retainer for holding the balls of the upper ball rolling grooves, and a pair of lower ball retainers,

said upper ball retainer is made of a synthetic resin material and has a substantially rectangular shape, said upper ball retainer supporting portions provided at axial opposite ends of said ball retainer and protruding axially therefrom and inserted into supporting holes of said end caps to support said upper ball retainer in a space between the upper surface of said guide rail and the inner surface of said slider main body facing the upper surface,

a ball holding groove having an arcuate cross section formed in each of lateral side surfaces of said upper ball retainer extending over a whole length thereof, and

a lip portion formed at an lower end portion of each the ball holding groove of said upper ball retainer, said lip portion being elastically deformable in a direction to expand the ball holding groove and forming together with a corresponding upper ball rolling groove of said slider main body an opening having a width substantially narrower than the diameter of the balls.

4,929,097

THIN-WALLED RECIPROCATING RECTILINEAR MOTION ROLLING GUIDE UNIT EQUIPPED WITH STRESS-RESISTING BALL RETAINER

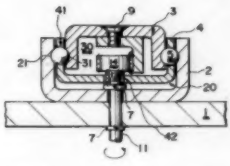
Tatsuo Mottate, Mitaka, Japan, assignor to Nippon Thompson Co., Ltd., Tokyo, Japan

Filed Sep. 15, 1989, Ser. No. 407,743

Claims priority, application Japan, May 11, 1989, 64-116060

Int. Cl.[5] F16C *29/04*

U.S. Cl. 384—49 **8 Claims**



1. A thin-walled rectilinear motion guide unit equipped with stress-resisting ball retainer, comprising a plate-like base member (1) having a vertically extending pinion bolt (11) penetrating therethrough in a freely rotatable fashion, an elongated bed member (2) having a U shaped cross section to form a trough-shaped groove (20) therein and secured onto the upper surface of said base member (1), a horizontal ball track groove (21) being provided on the inner surface of each of the opposing side walls of said bed member (2) at a predetermined height from the bottom wall thereof, an elongated table member (3) having an inverted U shaped cross section and adapted to be inserted within said trough-shaped groove (20) of the bed member (2) in a spaced and longitudinally freely slidable fashion, a horizontal ball track groove (31) being provided on the outer surface of each of the opposing side walls of said table member (3) at such a height as capable of oppositely facing the above-mentioned horizontal ball track groove (21) of the bed member (2), an elongated ball retainer (4) having a U-shaped cross section and adapted to be interposed within said trough-shaped groove (20) of the bed member (2), and between said bed member (2) and said table member (3), said ball retainer (4) providing, in the opposing side walls, a plurality of ball retaining openings (41) aligned in an equispaced relation with one another in a horizontal row at such a height as capable of directly facing, at both sides, the above-mentioned horizontal ball track grooves (21, 31) of the bed and table members (2, 3), respectively, so as to retain the respective balls (5) therein in a freely rotatable fashion, as well as a longitudinally and centrally extending elongated opening (42) in the bottom wall of said ball retainer (4) with a first rack (43) being provided on and along one of the side edges thereof, the above-mentioned vertically extending pinion bolt (11) further penetrating through the bottom wall of the overlying bed member (2) at a substantially central position thereof relative to both the longitudinal and lateral directions until it passes through said elongated opening (42) of the ball retainer (4) wherein is securely mounted on the upper portion of said pinion bolt (11), a composite pinion assembly consisting of a lower or first pinion part (12) having a smaller diameter adapted to mesh said first rack (43) and an upper or second pinion part (14) integrally and concentrically formed with said first pinion part (12) directly thereon, an elongated second rack member (32) having an L-shaped cross section and a longitudinal length substantially the same as that of the table member (3), forming a second rack (33) on and along one of the inner sidewalls thereof, said second rack member (32) being attached in cantilever fashion on the lower surface of said table member (3) extending in the longitudinal direction in such a manner that the second rack (33) is brought into meshing engagement with the above-mentioned upper or second pinion part (14) within the trough-shaped groove (30) of the table member (3) and the teeth of said first pinion part (12) and second pinion part (14) being

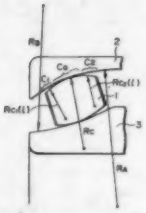
formed the same in form and size but the number of the former teeth being twice the number of the latter teeth.

4,929,098

SELF-ALIGNING ROLLER BEARING

Hirotoshi Takata, Yokohama; Eihiro Suruga, and Gentei Inoue, both of Fujisawa, all of Japan, assignors to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 19, 1989, Ser. No. 298,916
Claims priority, application Japan, Mar. 4, 1988, 63-49781
Int. Cl.[5] F16C *33/36*
U.S. Cl. 384—450 **3 Claims**



1. A self-aligning roller bearing having a plurality of spherical rollers disposed between the track surface of an inner race and the track surface of an outer race, characterized in that the generator of the track surface of the outer race has a single radius of curvature R_A, the generator of the track surface of the inner race has a single radius of curvature R_B, and the generator of the rolling surface of each roller is constituted by a curve having a plurality of radii of curvature, with a central portion of the rolling surface generator corresponding to at least 80% of the full axial length of the rolling surface and having a single radius of curvature R_C, and with opposite end portions of the rolling surface generator having respective radii of curvature $R_{C1}(l)$ and $R_{C2}(l)$, where

$$R_{C1}(l),\ R_{C2}(l) < R_C < R_A,\ R_B$$

and where each of $R_{C1}(l)$ and $R_{C2}(l)$ represents either a single radius of curvature or a greater number of radii of curvature progressively decreasing toward the corresponding end of said rolling surface generator.

4,929,099

MULTI-LINE SERIAL PRINTER

Scott M. Graham; Kenneth R. Ewing, both of Fremont; Marshall H. Trackman, San Leandro, and Duane R. Darr, San Jose, all of Calif., assignors to Qume Corporation, San Jose, Calif.

Filed Jan. 19, 1988, Ser. No. 145,272
Int. Cl.[5] B41J *3/02*
U.S. Cl. 400—76 **4 Claims**

1. A method for printing character oriented data comprising the steps:

first processing data representative of a plurality of printed characters and their relative locations with respect to a page to be printed into a first list sorted by the vertical distance from a baseline point of each particular character to the top of the page, said first list including a first character and a last character

then sequentially converting the data in said first list starting with said first character into a second list of characters sorted by the horizontal distance from a particular character to a specified edge of the page until either

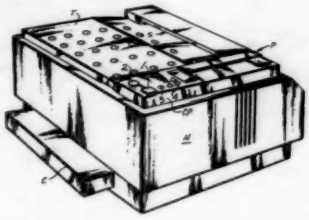
a first out-of-range character is reached in said second list that does not fall within a current print window having a predetermined window height at least three times the height of said printed characters, but less than the height of said page, or

said last character has been so converted

then sequentially printing the characters in said second list,

then reinitializing said second list

then continuing to convert the characters in said first list into characters in the reinitialized second list, until either



a second out-of-range character is reached in said first list that does not fall within said print window, or

said last character has been so converted

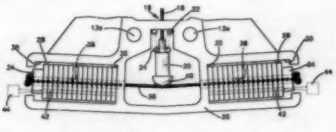
then sequentially printing the characters in said reinitialized second list.

4,929,100

TAUT BAND PIEZOELECTRIC ACTUATOR FOR WIRE MATRIX PRINTING ELEMENTS

William A. Patterson; Dien H. Tong, and James R. Wooden, all of Charlotte, N.C., assignors to International Business Machines Corp., Armonk, N.Y.

Filed May 4, 1989, Ser. No. 347,373
Int. Cl.[5] B41J *3/10*
U.S. Cl. 400—124 **10 Claims**



1. In a wire matrix printer having a plurality of driven wire printing elements the improvement comprising;

each printing element having actuation means operably associated therewith to drive the element against a printing medium from a retracted position to an actuated position and return,

said actuation means comprising an elongated flexible drive element anchored at opposite ends thereof, at least one end of said drive element having anchor means anchored to a piezoelectric crystal arrangement,

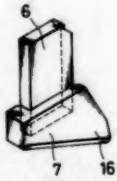
said piezoelectric crystal arrangement having electrical supply means for causing change in the length of said crystal arrangement responsive to a change in the applied electrical potential,

said drive element being normally maintained in a fully bowed retracted position and secured to said piezoelectric crystal arrangement so as to be driven toward an actuated less bowed condition by tightening said drive element upon a change in the electrical potential applied to the piezoelectric crystal arrangement to thereby drive said printing element axially to the actuated position from the retracted position.

4,929,101
RELEASE-TYPE DOT PRINT HEAD

Kuniaki Ochiai, and Shigeo Komakine, both of Shizuoka, Japan, assignors to Tokyo Electric Company, Ltd., Tokyo, Japan

Filed May 26, 1989, Ser. No. 357,776
Claims priority, application Japan, May 27, 1988, 63-130002
Int. Cl.[5] B41J *3/10*
U.S. Cl. 400—124 **3 Claims**

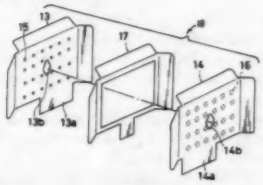


1. A release type dot print head comprising:
a plurality of cores placed respectively in solenoid coils and arranged on a plane;
a plurality of armatures swingably supported, urged away from the corresponding cores and fixedly provided with needles at the extremities thereof, respectively;
a yoke; and
a permanent magnet disposed between the cores and the yoke;
said cores, said armatures, said yoke and said permanent magnet forming magnetic paths;
wherein said cores are each formed of a plurality of plates of a magnetic alloy containing iron and cobalt as the principal components, and an auxiliary core associated with each of said cores is formed of a magnetic material which is different from that of said cores, said auxiliary cores being joined closely to the side surfaces of the cores and the permanent magnet, respectively.

4,929,102
RIBBON PROTECTOR INCLUDING ELECTRO-CONDUCTIVE ELEMENTS AND PLATEN GAP ADJUSTMENT DEVICE INCORPORATING THE SAME

Minoru Mizutani; Hiroshi Kikuchi; Shoichi Watanabe; Kunikaru Hayashi, and Masanori Maekawa, all of Tokyo, Japan, assignors to Oki Electric Co., Ltd., Tokyo, Japan

Filed Dec. 10, 1987, Ser. No. 131,093
Claims priority, application Japan, Dec. 10, 1986, 61-292608[U]; Dec. 10, 1986, 61-292609; Dec. 10, 1986, 61-189062
Int. Cl.[5] B41J *35/26*
U.S. Cl. 400—248 **9 Claims**

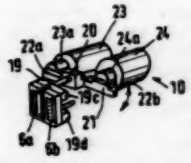


1. A platen gap adjustment device for use in a printer for adjustment of a gap between a tip of a printing head and a surface of a paper installed between a platen and a ribbon protector of the printer, the printing head being mounted on a carriage which is rotatably and slidably mounted on a carriage shaft which extends parallel to the platen to permit a spacing movement of said carriage along said platen comprising:
displacement means for displacing the rear end of said carriage to rotate said carriage about said carriage shaft so that said tip of said printing head is moved selectively toward and away from said platen; said displacement means including a parallel link element connected at one end to said rear end of said carriage and slidably fitted at the other end with a guide which is generally parallel to said platen;
said ribbon protector having an electrode which is conductive when a predetermined pressure is applied to said electrode during adjustment;
said carriage having a connector which receives said electrode;
drive means for driving said displacement means to obtain a reference position of said carriage for the adjustment of said platen gap based on conduction of said electrode of said ribbon protector; said drive means including a gap adjustment motor which causes said parallel link element to be resiliently deformed;
a control means for controlling operation of said gap adjustment motor, said gap adjustment motor and said control means being mounted on said carriage;
wherein, when said gap adjustment motor rotates in a predetermined direction, said parallel link element is resiliently deformed and said carriage is rotated about said carriage shaft in a first direction causing said tip of said printing head to be moved toward said platen;
when said gap adjustment motor rotates in an opposite direction, pressure on said parallel link element is released such that said parallel link element returns toward its original shape, causing said carriage to move about said carriage shaft in a second direction, thereby causing said tip of said printing head to be moved away from said platen; and
when, during rotation of said gap adjustment motor in said predetermined direction, said printing head reaches a position in which said tip of said printing head develops a predetermined pressure against said surface of said paper, said predetermined pressure is detected by conduction of said electrode of said ribbon protector, said position being determined by said control means as said reference position for said gap adjustment, said gap adjustment motor then being driven in said opposite direction through a predetermined angle of rotation of said carriage so that said tip of said printing head is pulled away from said platen so as to obtain a predetermined platen gap.

4,929,103
SHIFTABLE GUIDE FOR A MATRIX PRINTHEAD

Wolfgang Hendrischk, Neu-Ulm, Fed. Rep. of Germany, assignor to Mannesmann AG, Duesseldorf, Fed. Rep. of Germany

Continuation of Ser. No. 107,888, Oct. 13, 1987, abandoned, which is a continuation of Ser. No. 317,130, Nov. 2, 1981, abandoned. This application Feb. 10, 1989, Ser. No. 309,986
Claims priority, application Fed. Rep. of Germany, Nov. 6, 1980, 3041877
Int. Cl.[5] B41J *3/12*
U.S. Cl. 400—124 **5 Claims**



1. Matrix print head, having a case containing a plurality of print styli drives, there being a plurality of print styli extending through said case and from the respective drives therein,

through a mouthpiece at an end of the case, to be positioned adjacent a printing platen, the head provided for movement along the platen the improvement comprising:

said mouthpiece being movable within said case in a direction transverse to an extension of the styli;

a print styli and mouthpiece adjusting device in said case, including an electromagnet drive inside said case, said drive including a magnetic coil wound around a core to establish a coil/core configuration, said configuration having a longitudinal axis around which the coil extends, opposite magnetic poles developing at opposite ends of said configuration being spaced along said axis said axis extending along said print styli but being laterally offset with respect to said print styli; and

said electromagnet drive having an actuation end coupled to said mouthpiece for adjusting the position of a mouthpiece in said direction being also transversely to a direction of movement of said matrix print head and to the extension of said axis of said drive.

4,929,104

PRINTER SYSTEM FOR ENABLING USER TO SELECT VARIOUS FORMS-FEED MODES

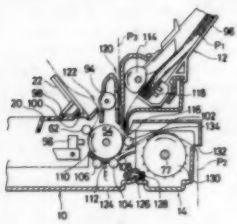
Takeshi Yokoi, Kagamigahara, and Shuhei Okamori, Nagoya, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Continuation of Ser. No. 946,303, Dec. 24, 1986, abandoned. This application Jan. 19, 1989, Ser. No. 300,712

Claims priority, application Japan, Dec. 25, 1985, 60-294505; Jan. 22, 1986, 61-11680

Int. Cl.[5] B41J *11/50*

U.S. Cl. 400—605 **8 Claims**



1. A method of selecting different form-feed modes in a printer including a printer main body, a cut form feed unit and a continuous form feed unit, for feeding cut forms and continuous forms, respectively,

said printer means main body having a print unit for conducting a printing operation in a printing position and form-driving unit for transporting a form to said printing position, said method comprising;

selecting said form-feed modes according to the presence of said cut form or said continuous form by a mode-selection switch;

comparing a selected present mode with its preceding mode to determine whether said present mode is the same as or different from said preceding mode;

examining by means of a sensor whether one of said form is in said form-driving unit, and emitting a detection signal when the sensor detects the presence of one of said forms in the form-driving unit;

issuing a form-feed starting signal to drive the form-driving unit in a forward or reverse direction;

driving the form in the forward or reverse direction based on the detection of the presence or absence of the form by said sensor, mode-selection by said mode-selection switch, and determination that the present mode is or is not the same as the preceding mode;

driving said form-driving unit in the forward direction when said sensor emits a detection signal indicating that said preceding mode is the cut form feed mode, whereby said form-driving unit is driven to discharge said remaining cut form from said form-driving unit; and

driving said form-driving unit in the reverse direction when said sensor emits a detecting signal indicating that said preceding mode is the continuous form feed mode and that said preceding mode is different from said present mode, whereby said form-driving unit is driven to discharge said remaining continuous form from the form-driving unit.

4,929,105

PAPER FEEDING APPARATUS FOR PRINTER

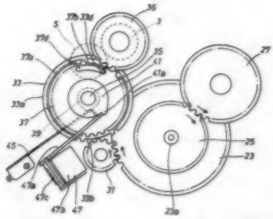
Takanobu Hirayama, Chita; Hiroyuki Funahashi, Nagoya; Eiji Yokota, Nagoya; Mitsuyoshi Uehara, Nagoya; Isao Kagami, Nagoya; Makoto Hasegawa, Kasugai, and Masaru Mizuno, Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Continuation of Ser. No. 112,218, Oct. 26, 1987, abandoned. This application May 15, 1989, Ser. No. 355,072

Claims priority, application Japan, Oct. 31, 1986, 61-261425; Sep. 17, 1987, 62-141910[U]

Int. Cl.[5] B41J *11/42, 13/10, 13/26*

U.S. Cl. 400—625 **6 Claims**



1. A paper feeder for a printing device having a motor for rotating a platen in normal and reverse direction, a paper feeding roller activated by said motor via an intermittent mechanism for feeding a sheet of paper toward said platen, said intermittent mechanism comprising:

a first intermittent gear rotatably supported on a shaft and having a first gear portion which engages with a drive gear connected to said motor and a toothless portion which does not engage therewith;

a second intermittent gear rotatably supported on the shaft and having a second gear portion which engages with a gear of said paper feeding roller and a toothless portion which does not engage therewith;

engagement means for making an engagement between said first gear portion of said first intermittent gear and said drive gear;

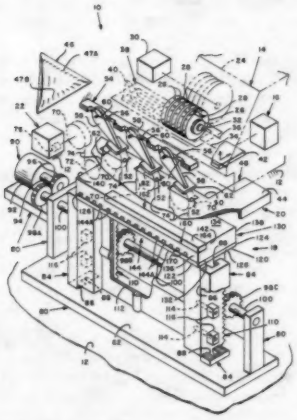
stop means for stopping said first intermittent gear such that said toothless portion thereof and said drive gear are opposed to each other; and

rotation means for integrally rotating said first and second intermittent gears when said first intermittent gear is rotated in normal direction, and for rotating at first only said first intermittent gear within a predetermined range and thereafter integrally rotating said first and second intermittent gears when said first intermittent gear is rotated in reverse direction.

4,929,106
PLATEN MODULE

Danilo P. Buan, Easton; Jovito N. Abellana, Trumbull, and Donald T. Dolan, Ridgefield, all of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Oct. 12, 1988, Ser. No. 256,513
Int. Cl.[5] B41J *11/08*
U.S. Cl. 400—649 **25 Claims**



1. An article of manufacture comprising:

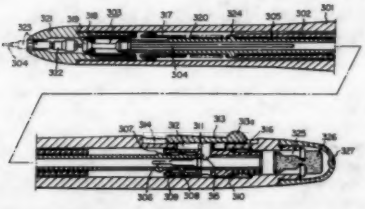
a. a molded piece-part including a substantially rectangularly-shaped plate portion having opposed surfaces, the piece-part including a pair of elongate parallel-spaced rack gear portions depending from one of the surfaces of the plate portion; and

b. a member made of a resilient material, the member having an inner surface facing the other of the surfaces of the plate portion and fixedly attached thereto, and the member including a plurality of intersecting channels extending thereinto from the inner surface thereof.

4,929,107
SWING-TYPE MECHANICAL PENCIL

Shuhei Kageyama; Takahiko Suzuki, and Yuichi Yamagishi, all of Kawagoeshi, Japan, assignors to Kotobuki & Co., Ltd., Kyoto, Japan

Filed Jun. 7, 1988, Ser. No. 203,784
Claims priority, application Japan, Jun. 12, 1987, 62-90663[U]; Jul. 31, 1987, 62-117960[U]; Oct. 14, 1987, 62-157740[U]; Mar. 18, 1988, 63-36964[U]
Int. Cl.[5] B43K *21/02, 21/06, 24/04*
U.S. Cl. 401—65 **6 Claims**

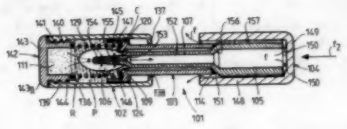


1. In a swing-type mechanical pencil having an outer sleeve (**201**) containing a lead feeder (**203**), a lead case (**205**) containing lead in said lead feeder (**203**), a knocking hammer (**202**) for knocking on said lead feeder (**203**) to extend lead (**204**) out of a head end (**221**) of said outer sleeve (**201**) by swinging said outer sleeve (**201**), the improvement comprising; a lead case bearing (**206**) engaging a rearward portion of said lead case (**205**); said lead case bearing (**206**) having a hole (**207**) through one side; an axial slit (**208**) in said outer sleeve (**201**) facing said hole (**207**) in said lead bearing case (**206**); a recess (**210**) in said outer sleeve (**201**) surrounding said axial slit (**208**); a slifer (**209**) slidably fitting said recess (**210**); said slider (**209**) having a projecting part (**211**) extending through said axial slit (**208**) into said hole (**207**) in said lead bearing case (**206**); said axial slit (**208**) having a narrowing neck portion (**212**) when said slider (**209**) is moved fully backward; said narrowing neck portion (**212**) locking said slider (**209**) against movement when said projecting part (**211**) is being retained; whereby lead may not be advanced out of the head end of said outer sleeve by the action of said knocking hammer when said slider is locked and may be manually extended out of head end of said slider by sliding said slider forward.

4,929,108
APPLICATOR VENTING ARRANGEMENT

Jean-Louis Gueret, Paris, France, assignor to L'Oreal, Paris, France

Filed Jun. 19, 1989, Ser. No. 367,724
Claims priority, application France, Jun. 27, 1988, 88 08591
Int. Cl.[5] A45D *33/02, 40/00*
U.S. Cl. 401—126 **15 Claims**



1. An applicator set (**101, 201**) for a powdered or paste product, in particular a cosmetic product (P), including a container (**102, 202**) provided with a neck (**103, 203**) and intended to contain the product (P), a cap (**104, 204**) for closing the container (**102, 202**), and an applicator (**106, 206**) disposed at the end of a rod (**107, 207**) attached to the cap (**104, 204**), said container (**102, 202**) including means (C) for compacting the product (P) around the applicator (**106, 206**), means (C) on which the user can act to generate a compacting of the product, and elastic means (R) for returning said compacting means (C) to their position of repose when the user ceases acting upon it, characterized in that the applicator (**106, 206**) is made of a material permeable to air, and that the rod (**107, 207**) of the applicator (**106, 206**) includes at least one passage for evacuation of the air which is present in the container (**102, 202**) and which is compressed at the time of compacting, the air to be evacuated penetrating said rod (**107, 207**) after passing through the material permeable to the air of which the applicator (**106, 206**) is made, and escaping via said evacuation passage or passages to outside the cap (**104, 204**).

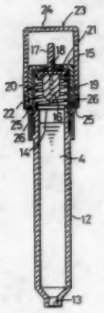
4,929,109
INK CARTRIDGE

Yasunori Ikenaga, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Sep. 29, 1989, Ser. No. 414,300
Claims priority, application Japan, Oct. 3, 1988, 63-129745[U]
Int. Cl.[5] B43K *23/02, 5/14, 7/02;* **G01D** *15/16*
U.S. Cl. 101—134 **3 Claims**

1. An ink cartridge comprising a cylindrically shaped cartridge body, both ends of which have openings that are sealed with sealing members to seal ink in said cartridge body, said sealing members being torn open to supply the ink to an ink tank in an ink jet printer through the lower opened end of said cartridge body inserted in said ink tank; a cylindrically shaped

holder cap having a closed end and fitted around the upper end of the cartridge body; a seal opener disposed facing said upper sealing member and connected to the lower end of an operating shaft inserted through a guide hole in the upper end of said holder cap; an elastic member urging said seal opener in an upward direction to separate it from said upper sealing member; and a seal packing provided on the upper end surface of



said seal opener and pressed onto the upper inner surface of said holder cap by the urging force of said elastic member to block an air inlet that is formed by a gap between said operating shaft and said guide hole, said operating shaft being pushed downward against the urging force of said elastic member to cause said upper sealing member to be torn open by said seal opener.

4,929,110

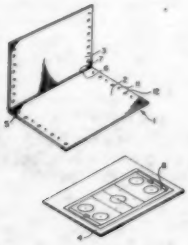
SPORTS BOARD

Larry Berg, 578 Sage Crescent, Sherwood Park, Alberta, Canada (T8A 0N1); Ricky A. Wright, 6009 Spruce Drive, Stettler, Alberta, Canada (T0C 2L0), and Philip A. Caswell, 11831 - 135 Street, Edmonton, Alberta, Canada (T5L 1W7)

Filed Dec. 29, 1988, Ser. No. 291,860

Int. Cl.[5] B42F *13/12, 13/14*

U.S. Cl. 402—73 **20 Claims**



1. A record board comprising in combination:

a first surface adapted to be written upon which is of a substantially rectangular shape, having two longer parallel sides, and two shorter parallel sides;

a second writing surface adapted to be written upon which is of substantially the same shape and size as the first writing surface;

a flexible hinge means connecting the first and second writing surfaces together along adjacent sides thereof, the connected sides of the first and second surfaces being of the same length, wherein the hinge means provides sufficient movement for either the writing faces or the rear faces of the first and second surfaces to be placed together; and

at least one paper or other writing sheet adapted to be positioned on each or either writing surface and retained thereon by attachment means;

wherein the attachment means comprises in combination:

a line of regularly spaced holes proximate two parallel edges of each surface;

each line comprising alternately holes of a first and a second diameter, the second diameter being larger than the first diameter;

male peg means inserted into each first diameter hole to provide an upstanding portion of a diameter smaller than the second diameter, and adapted to retain the writing sheet or sheets by engagement into matching holes provided therein;

holes provided in the writing sheet or sheets corresponding to and contiguous with the second diameter holes, of substantially the same size as the second diameter holes;

and wherein the lines of holes are placed in each writing surface so that when the two writing surfaces are closed together the upstanding portions of the male pegs on one writing surface enter into the second diameter holes in the other surface releasably thus permitting the two writing surfaces to be closed together.

4,929,111

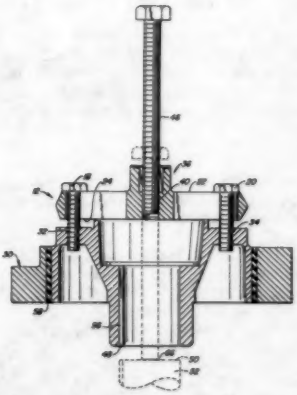
TOOL MANIPULATING HARMONIC BALANCER

Giuseppe Lauritano, 534 Laurel St., Redwood City, Calif. 94063

Filed Mar. 2, 1987, Ser. No. 22,321

Int. Cl.[5] B23P *19/04*

U.S. Cl. 403—16 **3 Claims**



1. A tool for permitting a wrench to turn a harmonic balancer and crank shaft connected thereto, and for separating the harmonic balancer from the connected crank shaft, comprising:

a. a base, said base including an opening therethrough forming a cavity having an enclosing wall portion, said enclosing wall portion including a threaded surface and faceted surface, said faceted surface being capable of engaging a wrench for turning said base;

b. a threaded member capable of threadingly engaging and moving along said threaded surface of said cavity enclosing wall portion, said threaded member being capable of extending through said opening of said base into engagement with said crank shaft while engaging and moving along said threaded surface of said cavity enclosing wall portion;

c. means for fixing said base to the harmonic balancer such

that said turning of said base turns the fixed harmonic balancer;

d. at least one closed slot through said base; said means for fixing said base to the harmonic balancer passing through said one closed slot.

4,929,112

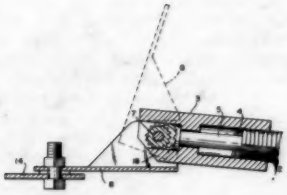
TOOL HANDLE WITH PIVOTING HEAD

Robert Wilcox, P.O. Box 1401, Hanford, Calif. 93232-1401

Filed Sep. 30, 1985, Ser. No. 782,027

Int. Cl.[5] B25G *1/06, 3/38*

U.S. Cl. 403—93 **5 Claims**



1. A tool holder having an attachment for interchangeable tools comprising:

A. a handle;

B. first angular control means, threadably attached to said handle, such that said first angular control means can be removed from said handle;

C. locking means disposed within said first angular control means and activated by said handle when said handle is attached thereto;

D. a wrist portion rotatably attached to, and angularly controlled by, said first angular control means such that said wrist portion can be positioned at a chosen operating angle and locked in place by said locking means;

E. an attachment plate rotatably fastened to said wrist portion;

F. second angular control means attached to said wrist portion such that said attachment plate can be rotated to a selected angle and locked into position.

4,929,113

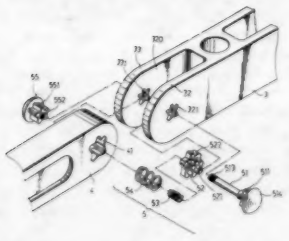
KNUCKLE JOINT

Yin-Ping Sheu, No. 3, Fl. 11-7, Fu Hsing Erh Rd., Ling Ya District, Kaohsiung City, Taiwan

Filed May 30, 1989, Ser. No. 357,798

Int. Cl.[5] F16C *11/06*

U.S. Cl. 403—157 **4 Claims**



1. A knuckle joint in which a first piece with an eye enters a jaw between two corresponding projections of a second piece having a first and a second eye respectively formed therein, and is retained by a pin assembly, wherein said pin assembly comprises:

a pin having a first end with a button fixed thereat and a second end, said pin being passed through said eye of said first piece, said pin retractably protruding said button out from said first eye of said second piece and extending said second end to a position near said second eye of said second piece;

a stopper having a protrusion passed through said second eye of said second piece, extending into said eye of said first piece, and joined with said second end of said pin; and

a slide block which is passed through by said pin and extended into said eye of said first piece, retractably protruding into said first eye of said second piece;

whereby said knuckle joint can be pivotally rotated while said button is depressed to push said protrusion of said stopper out from said eye of said first piece and to push said slide block out from said first eye of said second piece.

4,929,114

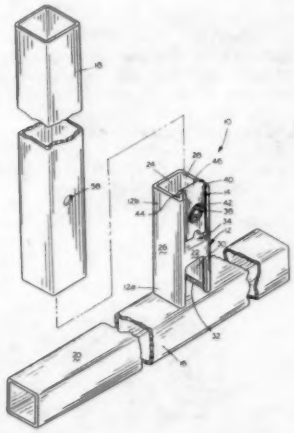
TUBING CONNECTOR

Errol D. Young, 3505 Old Maple Rd., Omaha, Nebr. 68134

Filed Feb. 13, 1989, Ser. No. 309,215

Int. Cl.[5] F16B *7/00*

U.S. Cl. 403—172 **4 Claims**



1. In combination

a base tube having opposite ends and a first side;

an attachment tube for connection to said base tube, having first and second ends and a first side, said first side having an aperture therethrough adjacent the first end thereof;

connector means for removably connecting said first end of said attachment tube to said first side of said first base tube, comprising:

a hollow tubular support member having upper and lower ends, a forward wall, a rearward wall and opposing side walls affixed to said base tube first side and projecting therefrom;

threaded means on said forward wall for operably receiving a set screw means;

set screw means having a head end and an opposite second end, operably mounted in said threaded means and having a length slightly less than the distance between the forward and rearward walls of said tubular support member;

said attachment tube having dimensions so as to slidably receive said support member within said first end thereof;

said attachment tube aperture located so as to be aligned with said threaded means when said attachment tube is placed on said support member;

whereby rotation of said set screw means inwardly will cause said second end to contact the rearward wall of said support member and bias said forward and rearward walls of the support member apart into frictional contact with the walls of said attachment tube;

said threaded means comprising:

said forward walls of said support member having an aperture therethrough of a diameter greater than that of said set screw means, such that said set screw means will pass freely therethrough; and

clip means connected to said forward wall having a threaded aperture therethrough adapted to operably receive a set screw, said clip means mounted with said threaded aperture axial to said support member aperture;

said clip means including a bracket means bent to form a forward leg generally parallel to a rearward leg, said rearward leg having a threaded aperture therethrough adapted to operably receive said set screw, said forward leg having an aperture axial to said rearward leg aperture and having a diameter greater than said set screw such that said set screw will pass freely therethrough, said bracket means being connected to said support member forward wall with said forward and rearward legs on opposite sides thereof and with the apertures in said legs aligned with the aperture in said forward wall.

4,929,115

RESILIENT SHAFT COUPLING

Manfred Lunke; Ulrich Falz, both of Dortmund, and Jürgen Walter, Haltern, all of Fed. Rep. of Germany, assignors to Hackforth GmbH & Co., KG, Herne

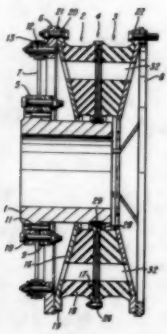
Filed Mar. 25, 1988, Ser. No. 173,287

Claims priority, application Fed. Rep. of Germany, Mar. 28, 1987, 3710390

The portion of the term of this patent subsequent to Nov. 24, 2004, has been disclaimed.

Int. Cl.[5] F16D *3/56*

U.S. Cl. 403—228 **2 Claims**



1. A resilient shaft coupling for interconnecting a rigid coupling member on a driving side and a rigid coupling member on a driven side particularly for a diesel engine drive mechanism with which considerably greater thermal stressability especially with elastomeric bodies having larger dimensions must be provided to avoid unacceptably high heating therein, said coupling having an axial direction and having the improvement in combination therewith comprising:

at least one resilient annular assembly that provides said interconnection between said rigid coupling members and that includes two ring halves that are disposed in axially abutting relationship as mirror images of one another, with each of said ring halves being divided into segments that are successively arranged in a circumferential direction, with each of said segments having a location of radial end faces thereof and comprising, when viewed in the axial direction of said coupling, an outer segment plate, an inner segment plate, and therebetween an elastomeric body that is vulcanized to said inner and outer segment plates, with said elastomeric body having a trapezoidal cross-sectional shape and including an entire axial width thereof which increases in a radially outer direction; the segments of one of said ring halves are offset relative to the segments of the other of said ring halves by one half of a segment division, with said inner segment plates of abutting ring half segments being clamped together; said elastomeric body of each of said segments is provided with at least one window, with each such window extending in a circumferential direction, as well as over the entire axial width of said elastomeric body, and having two end walls and therebetween two essentially concentric curved walls, with said end walls of said window terminating in the location of radial end faces of said segment; each of said inner and outer segment plates of each of said segments is provided with at least one opening, which is congruent with said at least one window of said elastomeric body of that segment, said window and said opening collectively forming an axial passage through which cooling air flows to alleviate problems of greater thermal stressability.

4,929,116

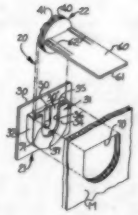
COUPLER ASSEMBLY FOR CONNECTING CORRUGATED SHEET MATERIAL

Robert R. Mahl, Cincinnati, Ohio, assignor to Chesapeake Display and Packaging Company, Winston-Salem, N.C.

Filed Mar. 31, 1988, Ser. No. 175,960

Int. Cl.[5] F16B *9/02*

U.S. Cl. 403—263 **6 Claims**



1. A coupler assembly adapted for interconnecting pieces of corrugated sheet material or the like to form point of purchase advertising displays, and characterized by the ability to permit the pieces to be interconnected in a selected rotational orientation, said coupler assembly comprising

a female connecting member including a generally planar back wall, and a receiving portion mounted on one side of said back wall and comprising a generally U-shaped side wall extending outwardly from said back wall, and a front wall joined to said U-shaped side wall so as to be parallel to said front wall and said back wall which is bounded by said side wall and open at the top, said back wall including a back wall portion positioned so as to define the rear surface of said pocket, an opening positioned in said back wall portion within the area bounded by said receiving pocket, and a slot in said front wall which extends from said top of said pocket to a slot terminus at a medial location on said front wall, and

a male connecting member comprising a pair of front and rear flanges, and a hub defining a central axis and extending between and interconnecting said flanges in an axially spaced apart and parallel relationship which is transverse

to said central axis, with the axial separation being at least about the thickness of said front wall, and with said rear flange being dimensioned to rotatably fit within said pocket and with said hub dimensioned to rotatably fit within said slot, an extension on the side of said rear flange opposite said front flange and aligned along said central axis and sized and positioned so that said extension is received into said opening positioned on said back wall portion when said members are in an assembled position, and a flat planar tab joined to the side of said front flange opposite said hub and extending parallel to said central axis,

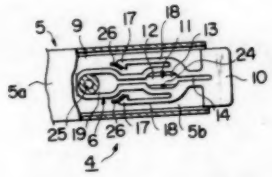
whereby said male connecting member can be releasably coupled to said female connecting member with said male connecting member in substantially any rotational orientation about said central axis by sliding said rear flange laterally into said pocket to an assembled position wherein said rear flange is substantially completely received in said pocket, said front flange overlies the side of said front wall opposite said pocket, and said hub is received in said slot adjacent said slot terminus.

4,929,117

MECHANISM FOR DETACHEABLY FITTING A MALE FIXING MEMBER AND A FEMALE ENGAGING MEMBER

Seijichi Yamanoi, Ina, Japan, assignor to Yamanoi Seiki Co., Ltd., Ibaraki, Japan

Filed Apr. 28, 1989, Ser. No. 344,349
Claims priority, application Japan, Dec. 26, 1988, 62-168515
Int. Cl.[5] F16B *21/00*
U.S. Cl. 403—328 **6 Claims**



1. A mechanism for detachably fitting a male fixing member and a female engaging member, comprising:

a male fixing member having a recessed neck and a head formed adjacent therewith at a top end of said fixing member;

a female engaging member which is detachably fit to said fixing member,

said engaging member having a hollow casing and an engaging body slidably inserted inside said casing so as to reciprocate along a longitudinal centerline of said engaging member,

said casing having a top plate and a base plate having an operation opening formed at one end thereof for inserting said engaging body, at least one of said top plate and said base plate having an insertion aperture for inserting the head of said fixing member and an engaging protrusion for engaging said engaging body to a predetermined position, and

said engaging body having a frame main body with a top end portion extended in the longitudinal direction and having, perforated therein, an engaging hole including an insertion portion for receiving the head of said fixing member and a sliding portion for engaging the neck of said fixing member that are continuous to each other in a longitudinal direction, at least one engaging arm integrally formed to the frame main body adjacent said engaging hole and resiliently extended outwardly therefrom, and a resilient member for resiliently urging the engaging body to the operation opening 8 of said casing,

said insertion portion of the engaging hole having a bulged portion formed with tapered surfaces, for abutment against the top end of the head of said fixing member, so that the engaging hole and the engaging arm are expanded and deformed laterally when the head of said fixing member and said tapered surfaces, are brought into press-contact, and

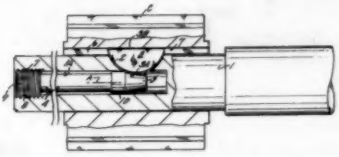
said insertion portion of the engaging hole being aligned with the insertion aperture of said casing when the engaging arm of said engaging body resiliently urged by the resilient member is snap-fit with the engaging protrusion of said casing.

4,929,118

SHAFT MOUNTED LOCKING MEANS

Ronald L. Anderson, 3641 Agate St., Eugene, Oreg. 97405

Filed Sep. 26, 1988, Ser. No. 248,640
Int. Cl.[5] F16B *3/00*
U.S. Cl. 403—356 **7 Claims**



1. Locking means for securing a shaft carried article in place, said locking means comprising,

a shaft segment having a radial key opening in communication with a shaft bore therein said shaft segment having a single key located

in said opening and having an inner surface disposed in said bore and an outer edge located outwardly of said shaft, and

an integral elongated lock axially positionable in said bore including a head portion of a size to occupy a segment of the shaft bore, a lock end engageable with the inner surface of said key to urge same outward of the shaft segment and into engagement with the shaft carried article, said head portion having a diameter substantially equal to the shaft bore diameter so as to be supported by the shaft segment against undue lateral displacement during locking engagement with the key.

4,929,119

SYSTEM FOR DISENGAGEABLY COUPLING A ROTOR BODY TO THE SHAFT OF ROTARY MACHINES, IN PARTICULAR GAS TURBINES AND ROTARY DOBBIES

Constantino Vinciguerra, and Massimo Coppini, both of Florence, Italy, assignors to Nuovopignone-Industrie Meccaniche e Fonderia, S.p.A., Italy

Filed Jul. 5, 1989, Ser. No. 375,462
Claims priority, application Italy, Jul. 15, 1988, 21381 A/88
Int. Cl.[5] B25G *3/28*
U.S. Cl. 403—359 **6 Claims**

1. An improved system for disengageably coupling two members, comprising:

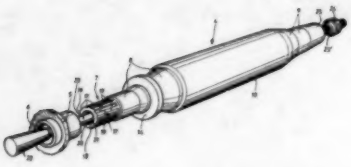
a shaft having an end portion, at least said end portion of said shaft being hollow so as to form a cavity, said end portion having a cylindrical outer coupling surface of a certain length, said cavity being frustro-conical in shape with a frusto-conical cavity wall and a wider end and a narrower end, said wider end lying nearer said end of said shaft than said narrower end;

a rotor body having a relatively smooth cylindrical inner coupling surface of a length that is about the same as that

of said cylindrical outer coupling surface, said inner and outer coupling surfaces being of approximately the same diameter and dimensioned so that said rotor body and said end portion of said shaft slidably engage one another, allowing said rotor body to be slid onto said end portion;

a frustro-conical plug having a wider end and a narrower end, said plug being slidably disposed within said cavity with said wider end lying nearer said end of said shaft than said narrower end, said plug having a frustro-conical outer surface matching that of said cavity wall so that when said plug is inwardly slid into said cavity said frustro-conical surface of said plug engages said frustro-conical cavity wall; and,

means for controllably urging said plug inward into said cavity;



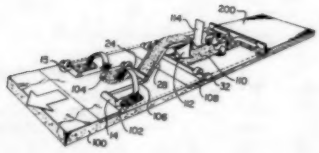
said cylindrical outer coupling surface having a plurality of sharp-edged grooves of relatively small depth extending along approximately said length of said cylindrical outer coupling surface, said grooves being distributed approximately symmetrically about said cylindrical outer coupling surface, said grooves being dimensioned so that when said means for controllably urging presses said plug into said cavity said end portion is elastically deformed so as to be displaced outward, causing said end portion to radially interfere with said rotor body, whereby said cylindrical outer coupling surface disposed between said grooves presses outward against and engages said cylindrical inner coupling surface, elastically compressing said rotor so that those portions of said cylindrical inner coupling surface disposed adjacent to said grooves extend at least partially inward into said grooves to form a plurality of projections which cooperate with said grooves to prevent relative motion between said shaft and said rotor body.

4,929,120

TWO STAGE PROCESS FOR REJUVENATING ASPHALT-PAVED ROAD SURFACES

Patrick C. Wiley, Williams Lake, and Allen H. Rorison, Kamloops, both of Canada, assignors to 373249 B.C. Ltd., Vancouver, Canada

Filed Apr. 19, 1988, Ser. No. 183,682
Claims priority, application Canada, Feb. 26, 1988, 559989
Int. Cl.[5] E01C *23/14*
U.S. Cl. 404—77 **8 Claims**



1. A method of rejuvenating an asphalt-paved road surface, comprising:

(a) heating an exposed upper layer of said asphalt to a selected temperature and to a depth of approximately one inch;

(b) grinding first and second approximately one inch deep outer strips of said heated upper layer from said road surface;

(c) windrowing asphalt ground from said first and second upper layer outer strips onto a central strip of said heated upper layer to expose first and second lower layer outer strips of said asphalt;

(d) grinding said upper layer central strip from said road surface to a depth of approximately one inch;

(e) removing said windrowed asphalt and said ground upper layer central strip asphalt from said road surface to expose a lower layer central strip of said asphalt;

(f) heating said lower layer to a selected temperature and to a depth of approximately one inch;

(g) rupturing said heated lower layer to a depth of approximately one inch;

(h) replacing said removed asphalt on top of said ruptured lower layer; and then,

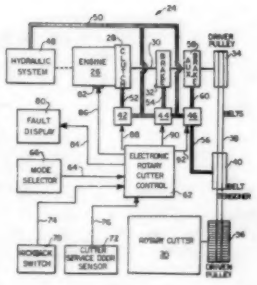
(i) applying pressure to force said removed/ruptured asphalt against said road surface.

4,929,121

CONTROL SYSTEM FOR A ROAD PLANER

Kevin C. Lent, Maple Grove; Conwell K. Rife, Jr., Champlin, both of Minn.; Gerald P. Simmons, Morton, and Albert J. Speck, Springfield, both of Ill., assignors to Caterpillar Paving Products Inc., Minneapolis, Minn.

Filed Sep. 5, 1989, Ser. No. 403,270
Int. Cl.[5] E01C *23/12*
U.S. Cl. 404—84 **14 Claims**



1. A control system for a road planer having a cutter rotatably mounted on said road planer, an engine operatively connected to the rotatable cutter, and at least one panel covering an access opening in said road planer, said control system comprising:

a clutch operatively connected to said engine and having an output shaft extending therefrom;

clutch control means for selectively engaging and disengaging said clutch;

a brake operatively connected to the output shaft;

brake control means for selectively applying and releasing said brake;

a first pulley operatively connected to said output shaft;

a second pulley connected to said rotatably mounted cutter;

an endless belt extending between said pulleys;

means for tensioning said belt and urging said belt into driving contact with said first and second pulleys;

belt tensioning control means for selectively engaging and releasing said belt tensioning means;

means for selecting one of a plurality of predetermined cutter operating modes and developing and delivering a

first output signal corresponding to said selected operating mode; and,

means for controlling preselected ones of said belt tensioning control means, brake control means and clutch control means in a preselected sequential order in response to receiving said first output signal.

4,929,122

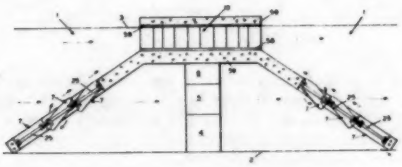
FISH PROTECTION SYSTEM FOR DAMS

Harold E. Yoas, 1110 W. Anther Ave., Redmond, Oreg. 97756

Continuation of Ser. No. 13,899, Feb. 11, 1987, abandoned. This application Feb. 24, 1989, Ser. No. 316,597

Int. Cl.[5] E02B *8/08*

U.S. Cl. 405—81 **16 Claims**



1. A fish protection system for dams comprising:

(a) at least one modular unit where said modular unit comprises:

(i) frame means;

(ii) means for attaching said modular unit to a stream bed which comprises:

at least one casing of said modular unit fixably attached to a stream bed; an outer box of said modular unit positioned around the outside of said casing and resting on said stream bed; and an inner box of said modular unit positioned inside of said outer box and around the outside of said casing where concrete fixably attaches said inner box and said outer box to said casing;

(iii) means for attaching said frame means to the means for attaching the modular unit to the stream bed;

(iv) a stationary screen and moving cleaning mechanism which is slideably positionable within said frame means for diverting fish away from turbines in a dam.

4,929,123

METHOD FOR BUILDING LARGE SPAN TUNNELS BY MEANS OF A CELLULAR ARCH

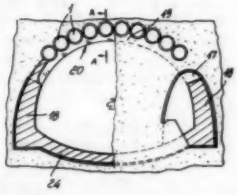
Pietro Lunardi, Piazza San Marco, 1, 20121 Milano, Italy

Filed Mar. 9, 1989, Ser. No. 320,969

Claims priority, application Italy, Mar. 16, 1988, 19807 A/88

Int. Cl.[5] E21D *9/04*

U.S. Cl. 405—150 **2 Claims**



1. A method for making large span tunnels through a ground formation, comprising the steps of excavating two channels at pier members of a top vault to be made, driving into said ground formation a plurality of adjoining tubes in parallel with a longitudinal axis of a tunnel to be made, said adjoining tubes being driven from a well formed transversely of said tunnel, further excavating said two channels at bottom portions thereof and casting therein said pier members, excavating bearing arch members and casting concrete around said tubes to interconnect said tubes, excavating a tunnel neck portion and a reverse arch and casting said reverse arch.

4,929,124

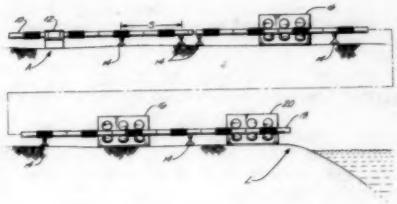
METHOD AND APPARATUS FOR CONSTRUCTING AND MOVING LONG PIPELINES

George S. Lockwood, Carmel Valley, Calif., assignor to Ocean Farms of Hawaii Limited Partnership, Hi.

Filed Jul. 28, 1988, Ser. No. 225,248

Int. Cl.[5] F16L *1/04*

U.S. Cl. 405—165 **28 Claims**



1. An apparatus for assembling a long pipe on land and rapidly launching the pipe into a body of water in a single, substantially continuous operation comprising:

a plurality of bearing means having bases capable of mounting on unprepared ground surface, arranged in spaced relation from a launch point to an end point located inland the approximate length of the completed pipe; and,

at least one traction means for concentric frictional engagement of the pipe to provide selectably continuous longitudinal force axially along the pipe, the traction means aligned with the bearing means and coaxially located between the end point and the launch point to receive the pipe through the traction means for moving the pipe along the bearing means.

4,929,125

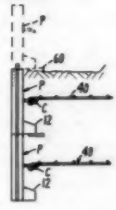
REINFORCED SOIL RETAINING WALL AND CONNECTOR THEREFOR

William K. Hilfiker, P.O. Drawer L, Eureka, Calif. 95501

Filed Mar. 8, 1989, Ser. No. 320,630

Int. Cl.[5] E02D *29/02*

U.S. Cl. 405—262 **9 Claims**



8. An improved precast concrete face panel for reinforced soil embankments, said panel comprising:

(a) a vertically extensive planar body section with steel reinforcing rods embedded therein, said section having top and bottom edges so formed that the top edge of one

of said sections is mutually engagable with the bottom edge of a like panel stacked thereabove;

(b) a cantilever section fixed to and extending longitudinally of and laterally from one side of the body section adjacent the bottom edge thereof for extension into a soil embankment being reinforced;

(c) a soil reinforcing polymer geogrid having;

(1) closed sided slots formed therein;

(2) a folded over end embedded in the planar body section to extend certain of the slots around reinforcing rods embedded within the face section; and,

(3) an extended end extending from the folded over end and the side of the planar body section from which the cantilever section extends at a level intermediate the top and bottom edges of the body section;

(d) a retaining rod embedded within the body section and extending through the folded over end of the geogrid to one side of the reinforcing rods about which the slots within the geogrid extend to secure the geogrid against separation from said reinforcing rods.

4,929,126

METHOD FOR INSTALLING A SCREEN OF FLEXIBLE MATERIAL IN THE SOIL

Bastiaan G. Steenbergen, Essen, Belgium; Arie A. Hofman, Renkum, and Willem De Waard, Oud-Beijerland, both of Netherlands, assignors to Digging Trading Company N.V., Klaaswaal, Netherlands

Filed Jan. 15, 1988, Ser. No. 144,087

Claims priority, application Netherlands, Jan. 21, 1987, 8700147

Int. Cl.[5] E02D *5/18*

U.S. Cl. 405—267 **11 Claims**

1. In a ground barrier including a vertical longitudinally elongate trench and a barrier screen positioned vertically within and longitudinally along said trench, said trench including an open top and a bottom, said screen including a top edge generally at the open top of said trench, and a bottom edge generally adjacent the bottom of said trench; the improvement wherein said screen comprises an elongate inflatable sleeve formed longitudinally along at least said top edge of said screen, and inflatable to transversely span said trench and define a substantially continuous support for said screen within said trench.

4,929,127

DRILL BIT FOR PRODUCING DRILLED HOLES WITH AN UNDERCUT

Artur Fischer, Waldachtal, Fed. Rep. of Germany, assignor to Fischerwerke Artur Fischer GmbH & Co. KG, Waldachtal/-Tumlingen, Fed. Rep. of Germany

Filed Jun. 22, 1989, Ser. No. 369,728

Claims priority, application Fed. Rep. of Germany, Jun. 22, 1988, 3821056

Int. Cl.[5] B23B *41/00*

U.S. Cl. 408—81 **8 Claims**

1. A drill bit for producing drilled holes with an undercut and comprising a drill bit shank having an end; at least one drill bit tip which is mounted at said end, projects laterally beyond said drill bit shank, and has a maximum width; a rounded collar having a diameter spaced from the drill bit tip, and integrally formed on the drill bit shank; and a longitudinally displaceable guide sleeve mounted between the drill bit tip and the collar and having an internal diameter which is smaller than the

diameter of the collar and smaller than the maximum width of the drill bit tip; the drill bit tip having lateral cutting edges, the drill bit shank having a flared enlargement in a region of the lateral cutting edges of the drill bit tip, and the guide sleeve having a continuous longitudinal slot.

4,929,128

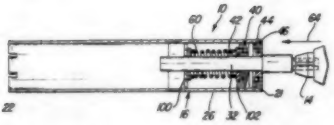
MASONRY DRILL ASSEMBLY

Robert J. Affleck, Box 745, Harrow, Ontario, Canada (N0R 1G0)

Filed Jun. 23, 1989, Ser. No. 370,826

Int. Cl.[5] B23B *41/02*

U.S. Cl. 408—139 **7 Claims**



1. A device for use with a drill motor having a chuck for drilling holes in masonry materials comprising:

a tube,

at least one masonry cutting element attached to one end of said tube,

a rod, said rod being adapted to be received in the chuck of the drill motor and rotatably driven about its axis by the drill motor,

means for coaxially attaching said rod to said tube so that said rod extends coaxially outwardly from the other end of said tube,

said attaching means comprising a clutch assembly having an engaged operating position and a released operating position, wherein in said engaged position said rod and said tube rotate in unison with each other while in said released position, said clutch assembly permits relative rotational movement between said rod and said tube.

4,929,129

KEY CUTTING APPARATUS

Russell A. Dickson, 5847 Venisota Rd., Venice, Fla. 34293

Filed Oct. 11, 1988, Ser. No. 255,453

Int. Cl.[5] B23C *3/35*

U.S. Cl. 409—81 **19 Claims**

1. A key cutting apparatus for cutting a blank key substantially from the cut dimensions of a pattern key comprising:

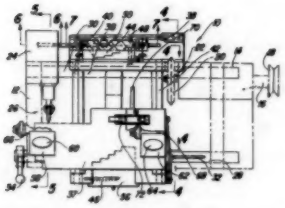
a frame portion having two sides, a back and a front;

a first movable portion mounted on said frame portion having a depth plate and a space plate removably mounted

thereon, said first movable portion being movable side to side;

a second movable portion mounted on said first movable portion, said movable portion providing forward and backward motions for depth control;

means for cutting said blank key mounted on said frame portion;



a telescoping stylus portion capable of following along by telescoping action the serrations of said pattern key; and

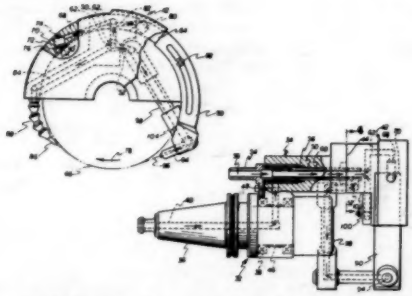
means for transmitting said telescoping action of said stylus portion to said depth plate and for adjusting said depth plate.

4,929,130

GRINDING WHEEL GUARD APPARATUS

Richard A. Diebolt, Wethersfield; Stephen Kidd, East Hampton, and Donald E. Rivers, Jr., Tolland, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Jun. 28, 1989, Ser. No. 372,725
Int. Cl.[5] B23Q *11/10*
U.S. Cl. 409—136 **17 Claims**



1. A grinding wheel apparatus comprising:

a machining center including a drive spindle for receiving a tool holder, and having a flow hole through the centerline thereof;

a primary pump for circulating primary coolant;

a secondary pump for circulating a secondary coolant;

a static flow connector located adjacent to said spindle;

a primary coolant flowpath from said pump to said hole through the centerline of said spindle;

a secondary coolant path from said secondary pump to said static flow connector;

a tool holder including a static holder portion and a rotary portion;

said rotary portion securable in said drive spindle and rotatably mounted in said static holder portion, and suitable for mounting an arbor supported superabrasive grinding wheel therein;

a holder primary flowpath entering said rotary portion through the centerline thereof, and in fluid communication with said primary coolant path, and exiting through said static holder portion;

a holder secondary flowpath entering and exiting said static holder portion;

a guard assembly, secured to said static tool holder portion including an arcuate frame surrounding an imaginary circle representing a potential grinding wheel;

a primary guard flowpath through said arcuate frame in fluid communication with one of said holder flowpaths;

said arcuate frame also including a secondary guard flowpath through said frame in fluid communication with the other of said holder flowpaths;

a cooling nozzle located at one arcuate end of said frame and arranged to discharge coolant tangential to said imaginary circle;

said primary guard path in fluid communication with said cooling nozzle;

at least one cleaning nozzle oriented substantially 30 degrees from the radial direction of said imaginary circle; and

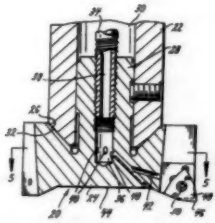
said secondary guard flowpath arranged to discharge coolant through said cleaning nozzles.

4,929,131

METHOD AND APPARATUS FOR A LINEAL MACHINE TOOL

James D. Allemann, Eureka, Mo., assignor to Westhoff Toll and Die Company, St. Louis, Mo.

Filed Mar. 24, 1989, Ser. No. 328,431
Int. Cl.[5] B23C *5/26*
U.S. Cl. 409—234 **13 Claims**



1. In a milling machine for lineal machining of metal from a workpiece, the milling machine having means to mount a cutting tool and advance it axially into the workpiece to thereby remove material therefrom, said tool mounting means including a spindle characterized by an outer, tapered annular surface and an axial cavity, the improvement comprising a cutting tool having an axial shank and an inner, tapered annular surface, and wherein said tool mounting means includes means to urge said axial shank into said axial cavity and said tapered surfaces into contact to thereby provide a bearing surface for supporting said tool as the machine is operated.

4,929,132

ARTICULATED PLATFORM CAR FOR THREE OR FOUR TRAILERS

Richard P. Yeates; Bruce E. Keating, both of Aurora, Ill., and William R. Halliar, Whiting, Ind., assignors to Trailer Train Company, Chicago, Ill.

Filed Jan. 9, 1989, Ser. No. 294,363
Int. Cl.[5] B61D *3/18, 47/00*
U.S. Cl. 410—56 **16 Claims**

1. A railroad flat car for transporting trailers having at least

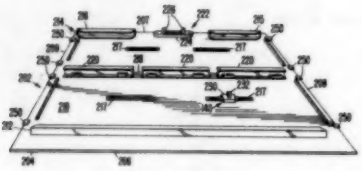
one tandem, comprising first and second units each having a frame mounted at either end on pairs of trucks, the units being connected by a drawbar, one of the units having a span hitch mounted thereon and positioned such that a trailer is attachable to the span hitch with the trailer spanning the drawbar and the tandem supported on the other unit, and said other unit having a floor mounted on its frame, the floor having a first portion of a width which is not large enough to fully support the tandem of a trailer whose longitudinal axis is angled from about 10 degrees to about 15 degrees from the longitudinal axis of said other unit, and a second portion, wider than the first portion, and having a width sufficient to fully support the tandem of the spanning trailer when the longitudinal axis of said tandem is angled from about 10 degrees to about 15 degrees from the longitudinal axis of said other unit.

4,929,133

LOADING PALLET FOR AIRCRAFT CARGO CONTAINERS

Albert D. Wiseman, Wilmington, Ohio, assignor to Airborne Express, Inc., Wilmington, Ohio

Filed Apr. 14, 1989, Ser. No. 338,039
Int. Cl.[5] B64C *1/20*; B60P *3/06*
U.S. Cl. 410—52 **21 Claims**



11. A pallet for loading cargo containers into a fuselage of an aircraft comprising

a generally planar rectangular base dimensioned to fit within the fuselage of an aircraft, said fuselage having a longitudinal axis and sidewalls, and said base having a pair of lateral edges positioned adjacent to said sidewalls and oriented generally parallel to said longitudinal axis and a pair of transverse edges oriented generally at right angles to said longitudinal axis and a centerline located substantially midway between said lateral edges and oriented generally parallel to said longitudinal axis;

a first lateral guide rail mounted on said pallet base adjacent to a first lateral edge of said pallet base and extending along substantially the entire extent of said first lateral edge;

a second lateral guide rail mounted on said pallet base at the second of said lateral edges and extending parallel to said lateral edge, said second lateral guide rail comprising two collinear rails having their adjacent ends spaced apart, said adjacent ends thereby defining an transfer space wide enough to permit the passage therethrough of a cargo container;

each of said guide rails comprising a lateral rail base for supporting said rail on said pallet base, a generally vertical lateral rail web, supported on said lateral rail base, extending upward from said lateral rail base and terminating in an upper extremity, and a generally horizontal flange projecting from said upper extremity of said vertical lateral rail web toward said centerline;

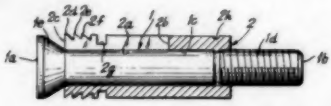
central anchor means located on said centerline for removably attaching to said pallet base a central guide rail, said central guide rail extending generally along said centerline; and retractable side lock means located generally within said transfer space.

4,929,134

EXPANSION DOWEL ASSEMBLY

Arndt Bergner, Munich, Fed. Rep. of Germany, assignor to Hilti Aktiengesellschaft, Fürstentum, Liechtenstein

Filed Sep. 22, 1988, Ser. No. 247,956
Claims priority, application Fed. Rep. of Germany, Sep. 22, 1987, 3731819
Int. Cl.[5] F16B *13/04*, *13/06*
U.S. Cl. 411—30 **3 Claims**



1. Expansion dowel assembly comprising an axially elongated anchor bolt having a leading end and a trailing end spaced apart in the axial direction, an expanding member located at the leading end of said anchor bolt and having an axially extending conically shaped surface converging toward the trailing end, an axially elongated shank extending from said expanding member toward the trailing end, means on said shank adjacent the trailing end for attaching a load on said anchor bolt, an axially elongated expansion sleeve laterally enclosing said anchor bolt and being axially displaceable relative to said anchor bolt, said expansion sleeve having a leading end closer to the leading end of said anchor bolt and a trailing end closer to the trailing end of said anchor bolt with slots in said expansion sleeve extending from the leading end toward the trailing end, said expansion sleeve having an inside diameter corresponding to and being displaceable relative to the outside diameter of said shank, said expansion sleeve having an axially extending outer surface with a circumferentially extending first cutting tooth thereon at the leading end thereof, wherein the improvement comprises two additional cutting teeth are formed on the outer surface of said expansion sleeve adjoining said first cutting tooth, and said cutting teeth forming a sawtooth-shaped section facing outwardly from the outer surface of said expansion sleeve, said expansion sleeve has a cross-sectional reduction spaced from and located closely adjacent to said cutting teeth and formed on the opposite side thereof from the leading end of said sleeve, said cross-sectional reduction is formed by a circumferentially extending annular groove located in the outer surface of said expansion sleeve, within the axial extent of the slots.

4,929,135

DEVICE FOR TEMPORARILY COUPLING-UNCOUPLING TWO MEMBERS, AND FOR SUBSEQUENT SEPARATION THEREOF

Jean-Jacques Delarue, Paris Cedex; Michel Patin, Les Mureaux, and Jean-Claude Slama, Plaisir, all of France, assignors to Aerospatiale Societe Nationale Industrielle, Paris, France

Filed Oct. 5, 1989, Ser. No. 417,760
Claims priority, application France, Oct. 5, 1988, 88 13028
Int. Cl.[5] F16B *19/00*; F42B *15/10*
U.S. Cl. 411—354 **12 Claims**

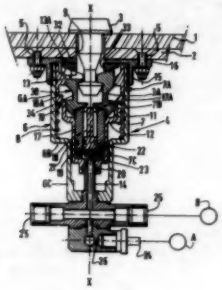
1. Device for temporarily coupling together and subsequently separating a first member and a second member, comprising:

a male member joined to the first member;

a female member joined to the second member and comprising an axially elongate hollow body in which are disposed a retaining sleeve adapted to retract radially onto the male member or to expand, a piston sliding axially to retract-/expand the retaining sleeve and, in the piston, disposed along the axis, an ejector finger joined to the piston by a readily broken member, and

selective control means for the piston adapted to command

movement of the piston and optionally simultaneous breaking of the readily broken member and to cause the



ejector finger to slide axially, the finger projecting axially relative to the piston.

4,929,136

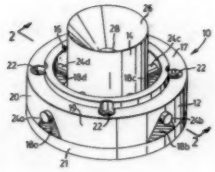
FLOATING MATABLE ELEMENT

Francis H. A. Mee, Aurora, Canada, assignor to Spar Aerospace Limited, Mississauga, Canada

Filed Mar. 17, 1989, Ser. No. 324,818

Int. Cl.[5] F16B *37/08*; B25B *13/00*; B25G *1/00*

U.S. Cl. 411—432 **23 Claims**



1. A compliant engageable apparatus comprising:

(a) a housing having an opening in its top surface opening and at least two receptors in its side;

(b) a floating member received by said housing having a projecting end projecting through said top surface opening and having wings such that a wing is received by each of said .eceptors, said projecting end having a tapered guide surface, said tapered guide surface tapering to engaging means, and

(c) urging means to urge said floating member to a floating position at which said wings abut the surface of said receptors which is proximate the top surface of said housing whereby said floating member has a preset aligment within said housing.

4,929,137

SAFETY ARRANGEMENT FOR PROVING THE UNAUTHORIZED OPENING OF A HOUSING

Alban Bossenmaier, Stuttgart, Fed. Rep. of Germany, assignor to Dasmler-Benz AG, Fed. Rep. of Germany

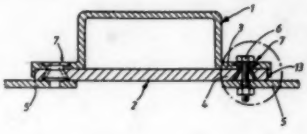
Filed Nov. 18, 1987, Ser. No. 122,364

Claims priority, application Fed. Rep. of Germany, Nov. 21, 1986, 3639870

Int. Cl.[5] F16B *19/04*

U.S. Cl. 411—501 **14 Claims**

1. A safety rivet arrangement for indicating an unauthorized opening of housing parts including a housing in which wall parts of the housing enclose a space and are connected at a formed by flanges on each of said wall parts, one of said wall parts having an apron integral therewith extending over the separating joint and engaging the flange of the other of said wall parts, the wall parts enclosing the space being riveted together by at least one safety rivet which can be removed only destructively and which is made of a harder material than the material of at least one of the connected wall parts, the



safety rivet consisting of steel, wherein a construction of at least one of the housing wall parts is of an aluminum or plastic material and the rivet having ends, one of which ends is peened-over in such a manner that the rivet is readily rotatable without any play.

4,929,138

DEVICE FOR FEEDING RODLIKE WORKPIECES

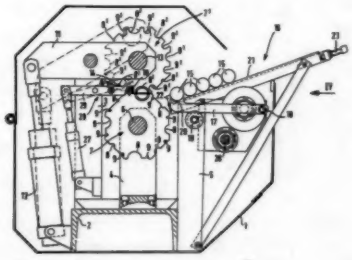
Kurt Breuning, Sindelfinger Strasse 9,, 7031 Steinenbronn, Fed. Rep. of Germany

Continuation of Ser. No. 170,041, Mar. 11, 1988, abandoned, which is a continuation of Ser. No. 893,687, Aug. 6, 1986, abandoned. This application Aug. 15, 1989, Ser. No. 394,071

Claims priority, application Fed. Rep. of Germany, Aug. 10, 1985, 3528743

Int. Cl.[5] B23Q *5/22*

U.S. Cl. 414—16 **32 Claims**



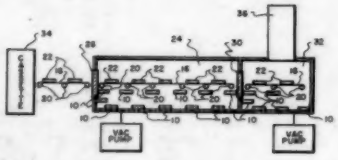
1. A device for feeding rodlike workpieces to a machine tool with at least one rod guide pipe for a rodlike workpiece to be processed, fed from a magazine into the rod guide pipe, characterized by the rod guide pipe being formed by two guide elements which can be lifted off each other for inserting the rodlike workpiece, and that the magazine is mounted adjacent the guide elements, said guide elements being respectively rotatably mounted about spaced axes and each having several separate recess means for respective support of rodlike workpieces of varying diameters, and means for controlling the rotational position of the guide elements to align like size recess means of respective guide elements to form said pipe, in each rotational position of the guide elements for which workpiece feeding occurs.

4,929,139

PASSIVE ELECTROSTATIC VACUUM PARTICLE COLLECTOR

John W. Vorreiter, Sunnyvale, and Robert L. Dean, Castro Valley, both of Calif., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Jul. 26, 1989, Ser. No. 385,042
Int. Cl.[5] B65H *1/00*
U.S. Cl. 414—217 **11 Claims**



1. In a particle beam lithography system having means for transporting processed and unprocessed wafers in vacuum chambers, a method comprising the steps of:

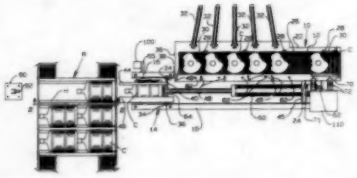
mounting passive particulate collectors on a bracket plate means, and placing a plurality of such plates at strategic locations in said vacuum chambers.

4,929,140

RACK LOADER

John B. Baker, 306A Maple St., Litchfield, Conn. 06759

Filed Feb. 17, 1989, Ser. No. 311,829
Int. Cl.[5] B65G *1/10*
U.S. Cl. 414—267 **13 Claims**



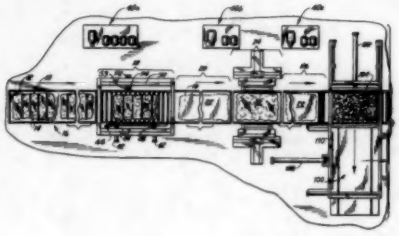
1. A loader for loading containers standing contiguously in a line on a generally horizontal conveyor onto a rack having a plurality of spaced superposed horizontal shelves, the loader comprising a transfer table spaced from the conveyor and having a first position generally coplanar with the conveyor, the table having vertical support means thereon having spacing corresponding to the spacing of the shelves of the rack, guide means disposed intermediate the conveyor and the table and adapted to guide the containers in diverging paths from the conveyor into the spaces on the table between the vertical support means respectively, means for moving the containers laterally from the conveyor along the guide means and into the spaces, table pivot means at one end of the table having a horizontal axis generally perpendicular to the conveyor and means for moving the table upward about the pivot means to assume a second position wherein the table is vertical and the vertical support means now horizontal, are aligned with the shelves of the rack.

4,929,141

BALE-OPENING METHOD AND APPARATUS

Charles R. Keesey, Sanderson, and Ted C. Flood, Jacksonville, both of Fla., assignors to International Baler Corp., Jacksonville, Fla.

Filed Feb. 21, 1989, Ser. No. 312,276
Int. Cl.[5] B65B *69/00*; B65G *65/02*
U.S. Cl. 414—412 **8 Claims**



1. A method for removing packaging from a cotton or similar bale when the bale is covered by such packaging in the form of sheet-like wrappings bound by a plurality of straps, comprising the steps of:

delivering the bale to a first station;

fixing the bale in position at said first station;

driving a cutter mechanism along the length of the bale, whereby the bale straps are cut;

releasing the bale and passing the bale to a second station;

removing the strapping and a portion of the sheet-like wrappings from the bale;

passing the bale to a third station;

rotating the bale 180° about a transverse axis;

passing the bale to a fourth station;

removing the remaining sheet-like wrappings from the bale; and

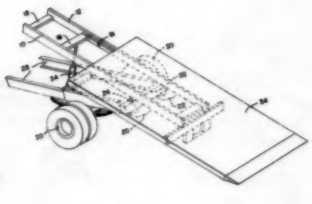
passing the bale to a fifth station, whereby the bale is made available for further processing of the cotton contained therein.

4,929,142

VEHICLE CARRIER WITH WHEEL LIFT

Ronald R. Nespor, Sharpsville, Pa., assignor to Chevron, Inc., Mercer, Pa.

Filed Jun. 9, 1988, Ser. No. 204,642
Int. Cl.[5] B60P *1/04*
U.S. Cl. 414—563 **15 Claims**



1. A combination tilting bed carrier and attached wheel lift apparatus for mounting on the chassis of a towing vehicle comprising,

a tilting bed platform,

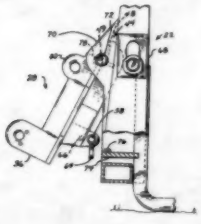
a tilting bed including first and second elongated beams for supporting said tilting bed platform,
said beams each having a forward end relatively near the cab of said towing vehicle and a rearward end relatively remote from the cab of said towing vehicle,
brace means for securing said beams in a spaced apart parallel relationship,
first bracket means secured to and extending downwardly from said first beam,
second bracket means secured to and extending downwardly from said second beam,
said first bracket means and said second bracket means depending from similar longitudinal positions on said beams,
first chassis pivot means for pivotally securing said first bracket to said chassis,
second chassis pivot means for pivotally securing said second bracket to said chassis,
a wheel lift including a front end and a rearward end, said rearward end extending rearwardly from beneath said tilting bed for lifting the wheels of a towed vehicle,
pivot means supported by said first and second brackets for pivotally mounting said front end of said wheel lift,
motive means mounted on said wheel lift for actuating pivotal movement thereoff about said pivot means,
first strut means having a forward end and a rearward end,
second strut means having a forward end and a rearward end,
the forward end of said first strut means secured to said first beam at a position on said first beam forwardly of said first bracket and the rearward end of said first strut means supported by said first bracket,
the forward end of said second strut means secured to said second beam at a position on said second beam forwardly of said second bracket and the rearward end of said second strut means supported by said first bracket, and
said first and second strut means being operable to transfer stresses applied to said wheel lift from said first and second brackets along the length of said first and second strut means to said first and second beams respectively at a point thereon forwardly of said first and second brackets.

4,929,143

QUICK-ATTACHING MECHANISM

Martin F. Dohnalik, Yankton, S. Dak., assignor to Gehl Company, West Bend, Wis.

Filed Jan. 31, 1989, Ser. No. 304,666
Int. Cl.[5] E02F 9/00
U.S. Cl. 414—723 **18 Claims**



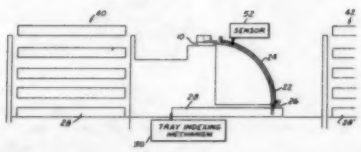
1. A quick-attaching mechanism for coupling an implement to the remote end of a boom structure or the like, comprising:
a mounting structure provided at the remote end of the boom structure;
a receiving structure provided on said implement and engageable by said mounting structure for removably attaching said implement to said boom structure;
upper pivoting engagement means for pivotably engaging said mounting structure and said receiving structure and providing an upper pivot axis, said upper pivot axis providing pivoting movement of said mounting structure and said receiving structure between an engaged position and a disengaged position;
lower latching means provided on one of said structures, said lower latching means being pivotable between a latching position and a release position and comprising a depending latch member pivotably mounted about a pivot axis to said structure and biased toward a downward position; and
lower stationary engagement means comprising a plate member mounted to the other of said structures;
wherein, after movement of said mounting structure and said receiving structure from their disengaged position to their engaged position, the downward bias on said lower latch member causes movement of said latch member to its latching position wherein it engages said plate member, and wherein the distance between said plate member and said latch member pivot axis when said mounting structure and said receiving structure are in their engaged position is less than the length of said latch member, so that said latch member returns only partially to its depending position to attain its latching position, said latch member engaging an upper surface of said plate member to securely couple said implement to said boom structure, whereafter movement of said latch member to its release position uncouples said implement and said boom structure by allowing pivoting movement between said mounting structure and said receiving structure from their engaged position to their disengaged position.

4,929,144

APPARATUS FOR LOADING RADIATOR FINS INTO TRAYS

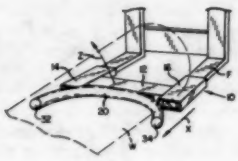
Ian Fraser, Westcliff, Great Britain, assignor to Ford Motor Company, Dearborn, Mich.

PCT No. PCT/GB87/00418, § 371 Date Dec. 16, 1988, § 102(e) Date Dec. 16, 1988, PCT Pub. No. WO87/07855, PCT Pub. Date Dec. 30, 1987
PCT Filed Jun. 15, 1987, Ser. No. 288,641
Claims priority, application United Kingdom, Jun. 17, 1986, 8614753
Int. Cl.[5] B65G 57/28; B21D 53/08
U.S. Cl. 414—799 **5 Claims**



1. Apparatus for loading convoluted radiator fins into parallel slots in a tray, characterised by an input conveyor (10) for transporting the fins in a horizontal attitude and lengthways, a part-cylindrical chute (22) disposed with its convex surface facing upwards and its axis of curvature generally horizontal and parallel with direction of movement of the input conveyor (10), the upper end of the chute being contiguous with the end of the conveyor, means for supporting a tray (28) beneath the chute with a slot adjacent the lower edge of the chute (22), and means (20) for laterally deflecting a fin off the conveyor (10) onto the chute (22) to cause the fin to slide over the surface of the chute (22) and, in doing so, to turn and fall in a vertical attitude into the slot in the tray (28) aligned with the lower edge of the chute (22).

4,929,145
FORKLIFT ADAPTER FOR STOCKING VERTICAL RACKS
George O. Thompson, 15917 SE. Clinton, Portland, Oreg. 97236
Filed Sep. 12, 1988, Ser. No. 243,429
Int. Cl.[5] B66F 9/12
U.S. Cl. 414—607 8 Claims



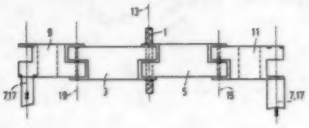
1. A forklift adapter for mounting to a forklift having at least one raisable fork positioned generally in a first plane, the mounted adapter to handle long slender workpieces and bundles of such workpieces, the adapter comprising:

a frame;

attachment means positioned generally in the first plane and mounted to the frame for attaching the forklift adapter to the forks; and

cradling means rigidly mounted to the frame for cradling a long slender workpiece or bundle of such workpieces during a transfer of the workpiece between horizontal and vertical orientations, the cradling means being an arcuate member having a central region rigidly mounted to the frame in the first plane and having two arcuate extending arms curved upwardly above the first plane.

4,929,146
MANIPULATOR
Marinus P. Koster; Willem Van Der Hoek; Nicolaas R. Kemper, and Hermanus M. J. R. Soemers, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.
Filed Apr. 29, 1988, Ser. No. 188,586
Claims priority, application Netherlands, Nov. 13, 1987, 8702715
Int. Cl.[5] B25J 18/00
U.S. Cl. 414—744.5 8 Claims

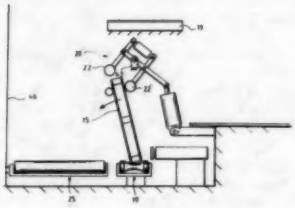


1. A manipulator comprising an end effector and a four rod mechanism with each rod coupled to two of the other three rods, said four rods being capable of moving said end effector in a predetermined plane, two of said four rods being rotatable about a main axis extending perpendicularly to said predetermined plane,

each of said rods comprising a bearing plate, a tubular section and a bridge between said bearing plate and said tubular section, said bridge extending parallel to said main axis, each said bearing plate being in a respective plane which is perpendicular to said main axis, and,

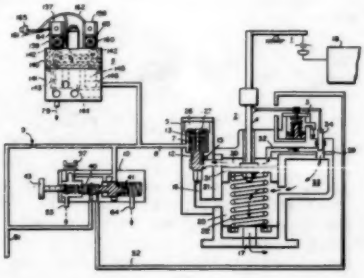
for each said rod, the respective bearing plate and tubular section being disposed to opposite sides of a common reference plane extending parallel to said predetermined plane, said tubular sections of rods coupled to each other being located on opposite sides of said common reference plane.

4,929,147
PROCESS FOR CONVEYING A TRANSPORT PLATFORM TO A LIFTING TABLE OF A STACKING STATION
Erwin Jenkner, Lindenstr. 13, D-7261 Bechingen-Bergwald, Fed. Rep. of Germany
Filed May 13, 1988, Ser. No. 194,679
Claims priority, application Fed. Rep. of Germany, May 14, 1987, 3716203
Int. Cl.[5] B65G 57/24
U.S. Cl. 414—786 11 Claims



1. In a process for conveying at least one transport platform having an approximately rectangular outline, which can be a pallet or a plate, whose length and width is larger than its thickness, to at least one lifting table of at least one stacking station at which a plurality of panels are stacked on said transport platform oriented horizontally on said lifting table, the improvement wherein an empty one of said transport platforms located in a normal position inclined from vertical adjacent said lifting table is placed on said lifting table located in a receiving position by tipping it into a horizontal position, said empty transport platform being tipped by the force of gravity onto said lifting table and said transport platform in said normal position adjacent said lifting table of said stacking station is oriented at an angle to said vertical from which said transport platform can tip by the weight of said transport platform to said lifting table as soon as a stop device retaining said transport platform in said normal position is released.

4,929,148
TURBINE TRIP THROTTLE VALVE CONTROL SYSTEM
Norman E. Nutter, Lunenburg, Mass., assignor to General Electric Company, Schenectady, N.Y.
Filed Dec. 27, 1988, Ser. No. 289,842
Int. Cl.[5] F01D 21/00
U.S. Cl. 415—32 31 Claims



1. In a hydraulic control system for a steam turbine wherein turbine speed is controlled through a throttle valve operator to regulate steam delivered to the steam turbine, and a trip mech-

anism is provided for shutting the steam turbine down, a combined pressure regulator, trip/reset valve comprising:

a pressure regulator valve for controlling the pressure of hydraulic fluid delivered to the throttle valve;

a trip/reset valve adapted to redirect hydraulic fluid from that delivered to the throttle valve to a drain to thereby actuate, the trip mechanism;

a hand trip control integral with said pressure regulator valve and said trip reset valve to connect said hydraulic fluid to said drain to shut said steam turbine down;

means for maintaining the trip mechanism in a tripped position until reset by an operator;

a control member to enable the operator to actuate said pressure regulator valve to selectively control the steam to the turbine, and to reset said trip mechanism

by further actuation of said pressure regulator valve to move said trip/reset valve out of said tripped position and to reestablish the pressure of the hydraulic fluid under control of said pressure regulator valve.

4,929,149

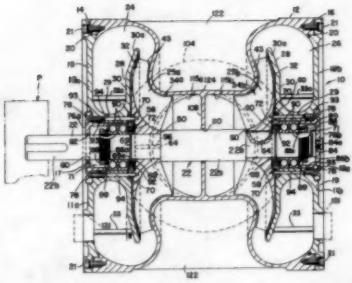
GAS BLOWER

Alexander Greenspan, Chesterland, Ohio, assignor to Superstream, Inc., Warrensville Heights, Ohio

Continuation of Ser. No. 175,649, Mar. 21, 1988, abandoned, which is a continuation of Ser. No. 864,927, May 19, 1986, abandoned, which is a continuation-in-part of Ser. No. 689,642, Jan. 8, 1985, abandoned. This application Oct. 26, 1988, Ser. No. 265,284

Int. Cl.[5] F01D *3/02*

U.S. Cl. 415—99 **17 Claims**



1. A centrifugal, inline, opposed balanced gas blower comprising a housing having a pair of opposed end walls aligned at opposite ends of a central axis, the housing including

a pair of opposed, axially spaced, generally annular radially symmetric impeller chambers;

a pair of opposed, axially spaced, generally annular, radially symmetric plenum chambers, each plenum chamber being disposed between an impeller chamber and the end wall closest to the impeller chamber, a radial outer portion of each impeller chamber being in communication for the flow of gas to a radial outer portion of the respective plenum chamber;

a pair of opposed, axially spaced, generally annular, radially symmetric deflectors, each connected to the end walls and disposed between the impeller chamber and the respective plenum chamber;

a rotatable drive shaft extending along the central axis into the plenum chambers and the impeller chambers;

a dividing wall extending perpendicular to the central axis through which the drive shaft extends;

a pair of gas inlets formed in the housing so that gas enters the housing on opposite sides of the dividing wall;

a pair of gas outlets formed in the housing opposed to and aligned with the gas inlets along a transverse axis perpendicular to the central axis so that gas is exhausted from the housing through the gas outlets from opposite sides of the dividing wall;

a pair of impellers mounted on the drive shaft, each disposed in the respective impeller chamber for rotation with respect there to; and

a pair of opposed, axially spaced inlet gas chambers for receiving gas from the gas inlets and for directing gas axially to the impellers;

each plenum chamber having an outlet portion including an exhausts gas displacement port formed in an inward radial wall of the plenum chamber in communication with an outlet gas chamber which is in communication with the gas outlet, the impellers being adapted for generally axial intake of gas from the in let gas chambers and generally centrifugal radially symmetric exhaust of the gas to the plenum chambers to initially pressurize the plenum chambers from which gas is displaced through the exhaust gas displacement ports, the impellers, impeller chambers, plenum chambers and deflectors being disposed in the housing such that there is substantially no axial load on the shaft.

4,929,150

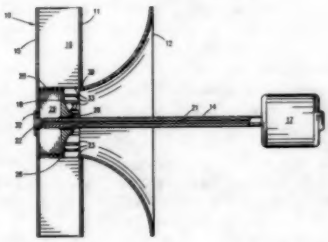
APPARATUS FOR ADJUSTING FLOW RATE THROUGH A FAN

Terry L. Daw, Murray, Utah, assignor to Daw Technologies, Salt Lake City, Utah

Filed Mar. 31, 1989, Ser. No. 330,911

Int. Cl.[5] F01D *17/14*

U.S. Cl. 415—157 **14 Claims**



1. A fluid transport system comprising:

an inlet opening,

a flow channel extending from the inlet opening to carry fluid in a controlled path through the drive system,

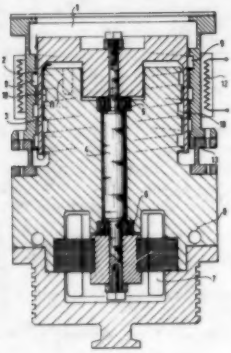
a fan chamber coupled in line with the flow channel and having a chamber opening communicating with the flow channel,

a fan member mounted within the fan chamber and including fan blades rotationally mounted to a base plate, said fan blades drawing fluid through the fan chamber upon rotation of the fan member to develop fluid flow through the channel and fan chamber,

means for adjusting an amount of fan blade exposure to the flow channel during rotation to provide variable adjustment to the rate of fluid flow through the transport drive system without the need for varying the rate of fan rotation, said adjustment means including a plate means located in said fan chamber, and

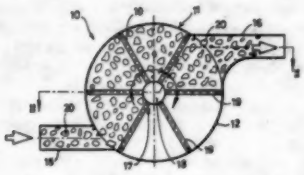
means attached to said base plate and to said plate means forming an adjustment chamber between said base plate and said plate means, whereby the flow rate through the fan changes as the location of the plate means in the fan chamber changes, said plate means being movable in the fan chamber in response to fluid changes in said adjustment chamber.

4,929,151
VACUUM PUMP
Jacques Long, Annecy, and Denis Perrillat-Amédé, Annecy Le Vieux, both of France, assignors to Societe Anonyme dite: Alcatel Cit, Paris, France
Filed Jun. 21, 1989, Ser. No. 369,401
Claims priority, application France, Jul. 27, 1988, 88 10120
Int. Cl.[5] F01D 5/08
U.S. Cl. 415—177 4 Claims



1. A molecular or turbomolecular type of pump comprising a stator and a rotor rotated by a motor, the stator having a first zone overlying the rotor and in which gas is admitted, and a second zone adjacent to the drive motor and cooled by a flow of fluid, wherein the first zone is provided with heater means for maintaining the temperature of said zone above the condensation threshold of the gas being admitted, with the first and second zones being separated from each other by a thermal impedance element.

4,929,152
METHOD AND APPARATUS FOR MAINTAINING A MIXTURE OF PRODUCTS AT A CERTAIN TEMPERATURE
Willem F. Hermans, Amstelveen, Netherlands, assignor to Stork Amsterdam B.V., Amsterdam, Netherlands
Division of Ser. No. 49,617, May 13, 1987, Pat. No. 4,802,825.
This application Jun. 17, 1988, Ser. No. 218,552
Claims priority, application Netherlands, May 14, 1986, 8601221
Int. Cl.[5] F04D 29/18
U.S. Cl. 415—203 11 Claims



1. An apparatus for maintaining at a certain temperature, and for a certain period of time, a flow of a mixture of products which includes a liquid of low to medium viscosity having solid particles contained therein, comprising:

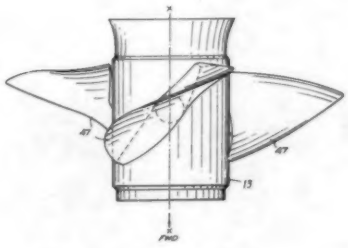
(a) a vessel for holding a mixture of products therein, the vessel having a peripheral inner wall;

(b) a mixture inlet pipe connected to the vessel and in fluid communication therewith;

(c) a mixture outlet pipe connected to the vessel and in fluid communication therewith; and

(d) means for controlling residence time in the vessel of substantially all solid particles which pass thereinto from the inlet pipe, the residence time controlling means comprising a conveyor mechanism having a central shaft disposed axially in the vessel, and at least one conveyor element which extends from the central shaft substantially radially outwardly in the vessel, the conveyor element extending close to the peripheral inner wall of the vessel to prevent passage of solid particles between the conveyor element and the inner wall.

4,929,153
SELF-ACTUATING VARIABLE PITCH MARINE PROPELLER
Stephen R. Speer, Spokane, Wash., assignor to Nautical Development, Inc., Spokane, Wash.
Filed Jul. 7, 1988, Ser. No. 216,014
Int. Cl.[5] B63H 3/10
U.S. Cl. 416—46 11 Claims



1. A variable pitch marine propeller comprising a hub case; drive securing means designed to secure the propeller to a rotating drive shaft on a boat such that the entire propeller rotates with the drive shaft; a plurality of blades extending radially outwardly from the hub case and comprising a hydrodynamic surface and a retainer shaft means extending axially from the hydrodynamic surface and being pivotally secured to the hub case such that each blade is mounted to the hub case for pivotal movement about a blade axis between two extreme angular pitch positions: a first locked angular position defining a lower pitch position, and second angular position defining a high pitch position; pitch shifting means comprising a mass member operably secured to the retainer shaft means and designed to cause the blade to pivot from one angular position to the other angular position in response to the reaction force generated upon rotation of the propeller; positive locking means comprising a locking member operably connected between the hub case and the retainer shaft means for preventing pivoting of the blade in response to the pitch shifting means when the blades are in the first locked angular position; and release means comprising a second mass member operably engaging the locking member and designed to move in response to the rotation of the propeller at a minimum threshold rotation velocity so as to release the locking means and to permit the pitch shifting mass to cause the pivoting of the blades.

4,929,154

BLADE ARRANGEMENT FOR A PROPULSION ROTOR

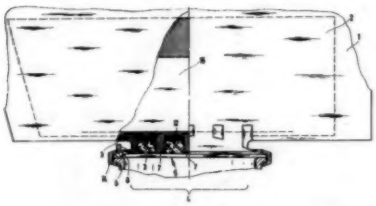
Walter Wildner, Munich, Fed. Rep. of Germany, assignor to MTU Motoren-und Turbinen-Union Munchen, Munich, Fed. Rep. of Germany

Filed Jan. 27, 1989, Ser. No. 302,327

Claims priority, application Fed. Rep. of Germany, Jan. 30, 1988, 3802774

Int. Cl.[5] F01D 5/14

U.S. Cl. 416—230 12 Claims



1. A rotor blade arrangement for a propulsion rotor of a turbojet engine or the like, comprising:

blade core means provided with a plurality of core webs spaced from one another and extending radially toward a rotor rotational axis when in an in use position on a rotor,

fiber loops made of fiber strands wound onto the blade core means to form a blade with a portion of said fiber loops extending between said core webs to anchor said fiber loops at the blade core means,

and blade core anchoring means for anchoring said blade core means to a rotor by way of said core webs and separately of the fiber loops, whereby said fiber strands are securely anchored to said rotor while being stressed only in tension in response to centrifugal forces acting on the blade during rotational operation of the rotor.

4,929,155

METHOD AND APPARATUS FOR CREATING A SECONDARY SOURCE OF POWER BY A PUMP

Richard O. Finley, Huntington Beach, Calif., assignor to Plastiflex Company International, Fountain Valley, Calif.

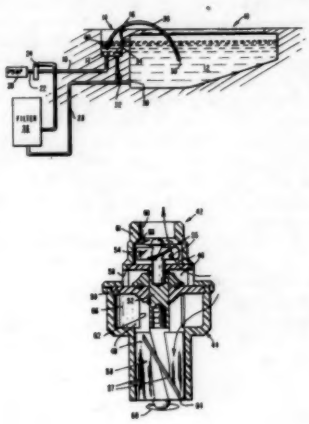
Division of Ser. No. 22,480, Mar. 5, 1987, Pat. No. 4,808,081, which is a continuation of Ser. No. 636,332, Jul. 31, 1984, abandoned. This application Nov. 7, 1988, Ser. No. 268,022

Int. Cl.[5] F04B 47/12

U.S. Cl. 417—53 20 Claims

1. In a swimming pool having a skimmer with a water inlet and a pump coupled to the inlet for enabling the pump to draw water from the skimmer and to return the water to the pool, a system for creating a secondary source of power, comprising:

first means adapted to be coupled to the inlet for enabling the pump to flow the water through the first means towards the pump and for deriving a primary source of power from the water flow; and



second means coupled to said first means and the primary source of power for creating the secondary source of power.

4,929,156

VARIABLE CAPACITY COMPRESSOR

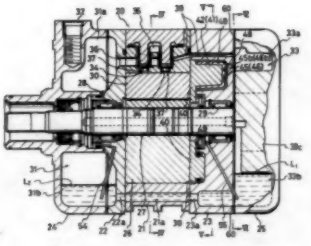
Kazuo Eitai, and Hidehiko Takayama, both of Konan, Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Jan. 30, 1989, Ser. No. 303,931

Claims priority, application Japan, Mar. 15, 1988, 63-61663

Int. Cl.[5] F04C 29/08; F04B 49/02

U.S. Cl. 417—295 5 Claims



1. In a variable capacity compressor having a rotor, a cylinder accommodating said rotor, a plurality of compression chambers being defined in said cylinder between said rotor and said cylinder, said compression chambers varying in volume by rotation of said rotor, a first discharge pressure chamber provided on one side of said cylinder and having a discharge pressure chamber section located at an upper portion thereof to be supplied with compression medium as high pressure from associated one of said compression chambers, and an oil sump portion located at a lower portion thereof, a discharge port provided on said one side of said cylinder and directly communicating with said discharge pressure chamber section, a second discharge pressure chamber provided on the other side of said cylinder and having a high pressure-introducing section located at an upper portion thereof to be supplied with compression medium from associated one of said compression

chambers, and an oil sump section located at a lower portion thereof, first communication passage means communicating said oil sump sections of said first and second discharge pressure chambers with each other, capacity control means operable in response to control pressure for controlling the capacity of said compressor, said capacity control means having a control pressure chamber in which said control pressure prevails, and second communication passage means communicating said high pressure-introducing section of said second discharge pressure chamber with said control pressure chamber,

the improvement comprising means in said second discharge pressure chamber isolating said high pressure-introducing section from said oil sump section; and

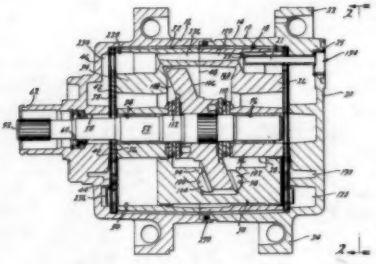
means for introducing said medium into said control pressure chamber from associated one of said compression chambers through said high pressure-introducing section and said second communication passage means while having no effect upon said oil sump section of said second discharge pressure chamber.

4,929,157

PULSATION DAMPER FOR AIR CONDITIONING COMPRESSOR

Duane F. Steele, Dearborn; Eugene C. Warman, Royal Oak, and Robert J. Hutter, Plymouth, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Nov. 23, 1987, Ser. No. 124,196
Int. Cl.[5] F04B *39/00*
U.S. Cl. 417—312 **4 Claims**



1. In a swashplate air conditioning compressor having a rotary swashplate and axially movable pistons located in cylinder bodies, said compressor having a refrigerant flow discharge port structure at one axial end of said compressor;

a damper comprising a damper tube of a calibrated length having a cross-sectional area less than the cross-sectional area of said port; and

a plenum chamber in one of said cylinder bodies surrounding said tube which communicates with the discharge sides of said cylinders;

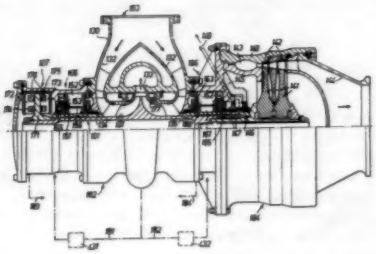
said tube having an open flow intake end located within said plenum chamber whereby refrigerant flow follows a reentrant flow path and the pressure pulsations due to the pumping action of said cylinders tend to cancel each other thus reducing noise, vibration and harshness of said compressor.

4,929,158

TURBOPUMP WITH ACTINE SUSPENSION FOR A PROPULSION SYSTEM

Jean-Philippe Girault, Tourny, France, assignor to Societe Europeenne de Propulsion, Suresnes, France

Filed Mar. 30, 1988, Ser. No. 175,165
Claims priority, application France, Apr. 9, 1987, 87 05042
Int. Cl.[5] F04B *17/00*
U.S. Cl. 417—405 **13 Claims**



1. Turbopump with active suspension for a propulsive system comprising a fixed casing, a rotary shaft fast with at least one turbine wheel, an axial active inside the casing, axial sensing means including detectors for detecting the axial position of the rotary shaft, two radial active magnetic bearings for the radial positioning of the rotary shaft inside the casing, at least two radial sensing means including detectors for detecting the radial position of the rotary shaft, and a control system receiving signals delivered by all the detectors in order to control, via said radial and axial active magnetic bearings, axial and radial play between the components of the machine fast with the casing and the components of the machine fast with the rotary shaft, wherein

said turbopump further comprises at least two back-up bearings, each constituted by a first ring fast with the rotary shaft, and a second ring fast with the casing, said second ring being concentric with the first ring and defining with said first ring a free space the length of which in the radial direction is about one half the length of the mean air gap of the radial magnetic bearings, said first and second rings being made of a composite material or a fluorinated thermoplastic resin,

said turbopump further comprising channels formed in the stator ferromagnetic cores of the radial active magnetic bearings so as to bring a fluid pressurized by the pump into the air gaps of said bearings, said air gaps of the radial magnetic bearings being defined by surfaces of geometrical shape varying slightly from one to the other in order to create significant hydrodynamic effects at the level of each of the radial active magnetic bearings.

4,929,159

VARIABLE-DISPLACEMENT ROTARY COMPRESSOR

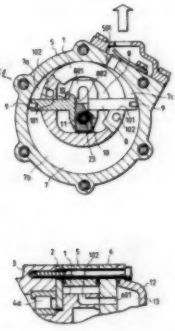
Isao Hayase, Katsuta; Kenichi Ushiku, Toukai; Kunisuke Tejima, Mito; Seiichi Hayashi, Hitachi, and Kazuhiko Satoh, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 7, 1988, Ser. No. 254,585

Claims priority, application Japan, Oct. 16, 1987, 62-260873; Jan. 8, 1988, 63-1202

Int. Cl.[5] F04C *18/344, 29/08*

U.S. Cl. 417—295 **16 Claims**



2. A variable-displacement rotary compressor as define in claim 1, further comprising means for changing said terminating end of said suction port formed in said side plate means.

4,929,160

SCROLL COMPRESSOR HAVING EXHAUSTING PIPE PRESSED INTO MUFFLER CHAMBER UNDER PRESSURE

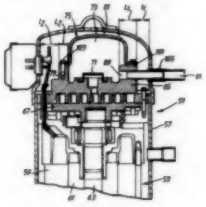
Toshinobu Inoue, Numazu, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 2, 1988, Ser. No. 239,990

Claims priority, application Japan, Sep. 10, 1987, 62-137577[U]

Int. Cl.[5] F04C *18/04, 29/06*

U.S. Cl. 418—55 **9 Claims**



1. A scroll type compressing apparatus comprising:

compressing means for compressing gaseous fluid, including a movable scroll member and a stationary scroll member engaging with the movable scroll member for defining a compressing cell therebetween, the stationary scroll member having an upper wall and a discharging opening formed to the upper wall for discharging gaseous fluid from the compressing cell;

muffler means for receiving gaseous fluid from the compressing cell through the discharge opening, including a circumferential side wall member substantially perpendicularly and integrally extending from the upper wall of the stationary scroll member and a substantially cup-shaped upper wall member supported by the circumferential side wall member, the circumferential side wall member having an exhausting port; and

an exhausting pipe inserted into the exhausting port of the circumferential side wall member under pressure.

4,929,161

AIR-COOLED OIL-FREE ROTARY-TYPE COMPRESSOR

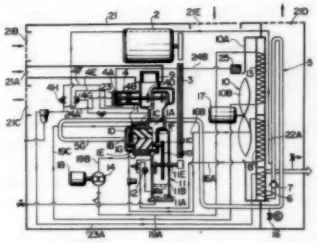
Masakazu Aoki, and Akira Suzuki, both of Shimizu, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 21, 1988, Ser. No. 260,774

Claims priority, application Japan, Oct. 28, 1987, 62-270452; Mar. 30, 1988, 63-74342

Int. Cl.[5] F04C *29/02, 29/04*

U.S. Cl. 418—83 **21 Claims**



1. An air-cooled oil-free rotary-type compressor comprising:

a first air cooling-type air cooler means including a plurality of cooling pipes; back flow preventing means; and a second air cooling-type air cooler means, wherein said first air cooling-type air cooler means, said back-flow preventing means and said second air cooling-type air cooler means are disposed in a channel of a discharge gas compressed in a compressor body.

4,929,162

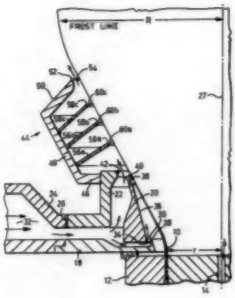
AIR RINGS FOR PRODUCTION OF BLOWN PLASTIC FILM

Mirek Planeta, 228 McCraney St., West, Oakville, Ontario, Canada (L6H 1H7)

Filed Mar. 9, 1989, Ser. No. 321,260

Int. Cl.[5] B29C *47/88*

U.S. Cl. 425—72.1 **6 Claims**



1. An air ring for the supply of cooling air to the exterior surface of an extruded tube of molten plastics material as it moves in a corresponding path of movement having a longitudinal axis, the ring comprising:

an annular bottom member, and an annular top member, each having an opening therein of circular cross-section

concentric with the tube path axis for the passage therethrough of the extruded tube moving in the said path;

the bottom member providing the radially inner lip of an orifice discharging an annular stream of air against the tube outer surface and in the same direction as that of the tube movement, and the top member providing the radially outer lip of the said orifice; and

an annular chamber forming member connected with and extending beyond the top member in the direction of tube movement;

the chamber forming member comprising a chamber forming lower end wall portion extending transversely of the longitudinal axis, a side wall portion that diverges progressively radially outwardly so as to be spaced a minimum predetermined distance along its entire length from the adjacent portion of the tube surface, and so as to conform in shape to the shape of the said adjacent portion of the tube surface, and an upper end wall portion that extends radially inwards transversely of the longitudinal axis; the chamber forming member having in its interior a plurality of longitudinally-spaced partition members each extending from the side wall portion toward the tube surface, the upper end wall portion and each partition member having a radially inner edge of relatively small dimension in the direction of tube movement adapted to be disposed adjacent the outer surface of the tube to form a respective annular gap between itself and the tube outer surface of radial dimension smaller than said minimum predetermined distance;

each partition member forming between itself and the immediately adjacent partition member, or between itself and the immediately adjacent radially inwardly extending lower end wall portion or upper end wall portion, a respective minor turbulence-producing chamber in which the air flow is turbulent to disrupt laminar flow of air over the adjacent portion of the tube outer wall;

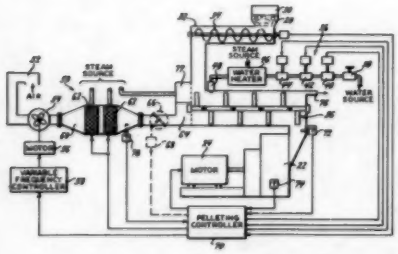
each turbulence-producing chamber also having produced therein by the passage of the air past the succeeding partition member radially inner edge a respective vacuum urging the tube radially outward toward the edge.

4,929,163

APPARATUS FOR A PELLET MILL WITHOUT STEAM ADDITION

Joseph A. Volk, Jr., Creve Coeur, Mo., assignor to Beta Raven, Inc., Earth City, Mo.

Filed Mar. 28, 1988, Ser. No. 172,755
Int. Cl.[5] B29B *13/02*
U.S. Cl. 425—143 **10 Claims**



1. In a pellet mill for mixing dry material and moisture into a mash and forming pellets therefrom, the pellet mill including a conditioner means for mixing moisture and dry material into a mash and a pellet producing means for forming pellets from the mash, the improvement comprising means for supplying heat to the conditioner means which is substantially moisture free as the principal source of heat for the pelleting process, and a separate means for supplying moisture substantially in its liquid phase only to the conditioning means.

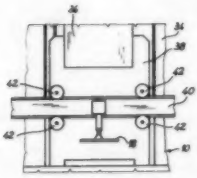
6. An automatic control and heat source for a pellet mill, said heat source comprising means for injecting heat into said pellet mill with substantially no moisture as the principal source of heat for the pelleting process, said pellet mill having a separate moisture supply means, said heat source including an air duct connected to and communicating with said pellet mill, means for pressurizing air into said air duct, and means for heating the air passing through said air duct, the control having means for varying the heat injected into the pellet mill by the heat source.

4,929,164

COMPOUND PRESS FOR PIECE MOLDING

Gianfranco Duina, Brescia, Italy, assignor to Norda S.P.A. Via Vallecamonica, Italy

Filed Oct. 19, 1988, Ser. No. 259,974
Claims priority, application Italy, Oct. 22, 1987, 22373A/87
Int. Cl.[5] B28B *13/02, 13/06;* **B29C** *43/34*
U.S. Cl. 425—145 **1 Claim**



1. A press apparatus for molding work pieces and for discharging the molded work pieces from a press (**10**) comprising a frame (**34**) for supporting said press, feeding means (**14**) for feeding the work pieces one by one to the press, said feeding means being incor orated in said press, said press having molding parts and means for moving said work pieces incorporated in said press, said frame supporting said molding parts and said means for moving said work pieces, a single command and control unit (**30**), means (**32**) for connecting said control unit to said press, said feeding means comprising a vertically movable carriage (**38**), a feed rod (**40**) to position the pieces in the press, said rod being provided with gripping means and being slidably supported in the horizontal direction by said movable carriage, said feed rod (**40**) being supported on the movable carriage by means of rollers (**42**) carried by said carriage and placed above and below said feed rod, and a program control mechanism whereby after each work piece is positioned in the correct position for molding, said carriage is lowered and after the molding is completed, said carriage is raised, each molded piece is discharged and said apparatus operates totally autonomously.

4,929,165

DIRECT-PRESSURE MOLD CLAMPING MECHANISM

Yoshiharu Inaba, 3509, Ikuta, Tama-ku, Kawasaki-shi; Fumio Mitoguchi, 1-10-9, Hinohon-machi, Hino-shi, and Hiromasa Yamashita, 1218-7, Otaueno-machi, Takamatsu-shi, all of Japan

Continuation of Ser. No. 167,852, Feb. 25, 1988, abandoned.
This application Apr. 6, 1989, Ser. No. 333,811
Claims priority, application Japan, Jun. 30, 1986, 61-151523
Int. Cl.[5] B29C *33/22, 45/66*
U.S. Cl. 425—150 **6 Claims**

1. A direct-pressure mold clamping mechanism for use in an injection-molding machine having a moving platen, said mechanism comprising:

a single ball nut connected for movement in unison with said moving platen;

a rotatable single ball screw threadedly engaged with said

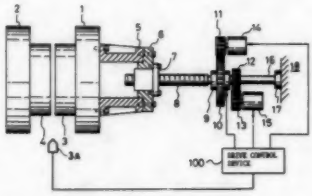
single ball nut whereby rotation of said ball screw effects rectilinear motion of said ball nut;

a ball screw shaft integrally connected to said ball screw;

a coarse-adjustment servomotor, having a motor shaft extending in parallel with said ball screw, for driving said single ball screw;

transmission means, having a first spur gear fixed on said motor shaft of said coarse-adjustment servomotor and a second spur gear meshing directly with said first gear and fixed on said ball screw shaft, for transmitting rotation of said coarse-adjustment servomotor to said single ball screw, thereby rotating said single ball screw at high speed;

a fine-adjustment servomotor, having a motor shaft extending in parallel with said ball screw, for driving said single ball screw, said fine-adjustment servomotor having a rotation speed and a rotary force when operating;



a speed reducer, having a first spur gear fixed on said motor shaft of said fine-adjustment servomotor and a second spur gear meshing directly with said first gear of said speed reducer, for reducing the rotation speed and enhancing the rotary force of said fine-adjustment motor, and for transmitting the thus enhanced rotary force of said fine-adjustment servomotor to said single ball screw;

a clutch fixed on said ball screw shaft for releasably coupling said ball screw shaft to said second spur gear of said speed reducer;

a detector operatively coupled to at least one of said fine- and coarse-adjustment servomotors, for detecting a moving position of said moving platen; and

control means connected in control relation with said coarse- and fine-adjustment servomotors, said detector, and said clutch, for controlling said servomotors and said clutch in accordance with a detected moving position of said moving platen.

4,929,166

SUPPORT FOR QUICK MOLD CHANGING

John DiSimone, Woodbridge; Paul Brown, Orangeville, and Christopher Huntington, Everett, all of Canada, assignors to Husky Injection Molding Systems Ltd, Bolton, Canada

Filed Nov. 21, 1988, Ser. No. 274,469

Int. Cl.[5] B29C *45/66*

U.S. Cl. 425—190 **18 Claims**

1. An injection molding machine comprising:

a stationary platen;

upper and lower tiebars extending from said stationary platen;

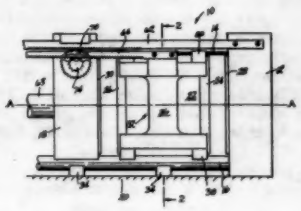
an outer platen along said tiebars;

a movable central mold portion and a non-uniform width slot in each sidewall of said central portion;

means for moving said central mold portion to and from an installed position;

means for supporting said central portion so as to facilitate its quick removal and installation;

said supporting means including a movable frame on each side of said movable central portion; and



each said movable frame having means for engaging one of said slots on said central portion as said central mold portion is being moved from and to said installed position.

4,929,167

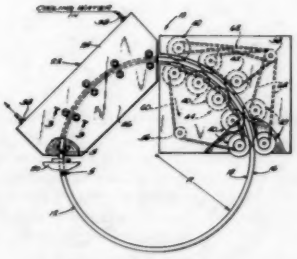
APPARATUS FOR PRODUCING A HELICAL TUBE

Kenneth V. Pepper, Rte. 3, Pamela La., Plymouth, Wis. 53073

Continuation of Ser. No. 62,534, Jun. 12, 1987, abandoned. This application Jul. 11, 1988, Ser. No. 219,885

Int. Cl.[5] B29C *53/08*

U.S. Cl. 425—325 **11 Claims**



10. An apparatus for conveying an elongate object, said apparatus comprising a roller having therein a circumferentially extending groove positioned to receive the object, said groove having a radially innermost portion having a relatively high coefficient of friction, and said groove having a radially outer portion defined by opposed side walls extending radially outwardly from said radially innermost portion of said roller and having a relatively low coefficient of friction, and means for rotating said roller so that said radially innermost portion of said roller drivingly engages the object and said side walls slidably engage the object and retain the object within said groove.

4,929,168

APPARATUS FOR PRODUCING A TUBULAR OBJECT OF POLYETHELENE TEREPHTHALATE OR OTHER THERMOPLASTIC MATERIAL FROM A TUBULAR BLANK OF AMORPHOUS MATERIAL

Kjell M. Jakobsen, Skanör, and Claes T. Nilsson, Loddeköpinge, both of Sweden, assignors to PLM AB, Malmo, Sweden

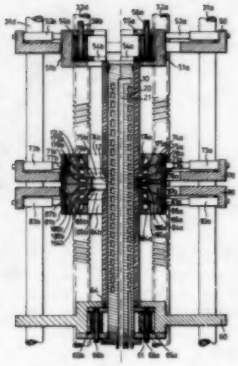
Continuation of Ser. No. 559,666, Dec. 9, 1983, Pat. No. 4,631,163, Division of Ser. No. 489,750, Apr. 29, 1983, Pat. No. 4,580,968, which is a division of Ser. No. 264,665, May 18, 1981, Pat. No. 4,405,546. This application Oct. 21, 1986, Ser. No. 921,336

Claims priority, application Sweden, May 29, 1980, 8004003

The portion of the term of this patent subsequent to Apr. 8, 2003, has been disclaimed.

Int. Cl.[5] B29C *55/00*

U.S. Cl. 425—384 **3 Claims**



1. An apparatus for the production of a tubular object of polyethylene terephthalate material with cylindrical sections in which a thickness of the material has been reduced and formed from a tubular blank of said material which is in an amorphous state, said apparatus comprising a plurality of draw rings to surround said blank and a plurality of driving devices to move the draw rings relative to the blank along the axis of the blank, the draw rings being provided with channels for passage of a liquid for controlling a temperature of the material in the blank at a value close to the range of the glass transition temperature of the material in at least one transitional zone which is moved along the blank by the draw rings and in which the material has bearing surfaces against the draw rings during the reduction in thickness, said draw rings being dimensioned so that as said transitional zone of the material is moved by the draw rings, the material undergoes change of state from the amorphorous state to a monoaxially oriented state as the material is reduced in thickness, the temperature control of the blank at said transitional zone acting in combination with the axial displacement of the transitional zone along said blank to produce substantially no radial force at the interior surface of said blank.

4,929,169

WORKING EQUIPMENT FOR ROUGHENING THE SIDE OF OPTICAL FIBER

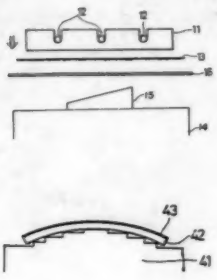
Takashi Fujigaki, Kanagawa; Yoshikazu Fujinaga, Aichi; Shuichiro Tokuda, Aichi; Noriyuki Furukawa, Aichi; Kiyoshi Ichimura, Tokyo; Yukio Shibuya, Tokyo, and Shigeru Iuchi, Tokyo, all of Japan, assignors to Mitsubishi Rayon Co., Japan

Filed Jun. 13, 1988, Ser. No. 206,065

Claims priority, application Japan, Jun. 19, 1987, 62-93351[U]

Int. Cl.[5] B24B *7/20*

U.S. Cl. 425—385 **3 Claims**



1. A working equipment for roughening a side of optical fiber ribbon, comprising: a hot stamper, a sheet having a rough surface to be transferred disposed below said stamper, a cushion disposed below said sheet and a cushion-mounting plate disposed said cushion disposed below said sheet, said cushion mounting plate having a mounting surface portion on which said cushion is mounted, said mounting surface portion having a profile selected from the group consisting of a stepped shape, a continuously curved form, and an inclined form, wherein said ribbon is to be disposed between said sheet and said cushion.

4,929,170

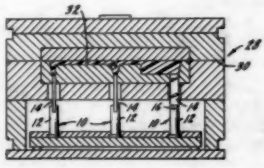
EJECTOR BLADE

Borislav Boskovic, 2102 Bannockburn, Inverness, Ill. 60067

Filed Apr. 27, 1989, Ser. No. 343,676

Int. Cl.[5] B29C *45/40*

U.S. Cl. 425—556 **17 Claims**



1. An ejector blade for a plastic injection mold, the ejector blade comprising

a. an elongated shank portion,

b. a blade portion having a first end extending from one end of said shank portion, and

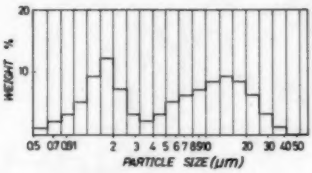
c. means releasably joining said shank portion to said blade portion at said ends so that a different blade portion can be mounted on said shank portion, said means releasably joining comprising a transverse aperture in said first end of said blade portion, a transverse aperture in said one end of said shank portion, said apertures being in registration with one another, and means engaged in said apertures to flexibly join said portions.

4,929,171

COMPOSITE POLYVINYLCHLORIDE PLASTISOL COATING AND METHOD OF APPLYING IT TO A METAL SHEET

Yoshio Hayashi; Tetsuo Nakamoto; Katsumi Kanada, and Yoshikazu Kondo, all of Yamaguchi, Japan, assignors to Toyo Kohan Co., Ltd., Japan

Filed Nov. 22, 1988, Ser. No. 275,567
Int. Cl.[5] B05D *3/06*
U.S. Cl. 427—54.1 **11 Claims**



1. A method of applying a composite polyvinylchloride coating to a metal sheet, comprising:

applying a coating of a composite polyvinylchloride plastisol to a metal sheet, said composite polyvinylchloride plastisol comprising,

100 parts by weight of a polyvinylchloride powder of which more than 95 weight percent is composed of particles whose sizes are in the range of 0.5 to 40 μm, and wherein of that, 20 to 60 weight percent is composed of particles in the range of 0.5 to 5 μm and 35 to 75 weight percent is composed of particles in the range of 5 to 40 μm, so that a distribution curve of particle sizes shows 2 peaks in the ranges of 1 to 3 μm and 8 to 15 μm,

5 to 60 parts by weight of an acrylic resin powder having an average degree of polymerization of 500 to 30,000 and having particle sizes of more than 0.1 μm and less than 40 μm,

5 to 60 parts by weight of an acrylic monomer, an acrylic oligomer or a mixture thereof, which monomers or oligomers have at least one functional group, and

at least one heat setting initiator or photoinitiator,

whereby a composite polyvinylchloride coated metal sheet is obtained; and,

heating the composite polyvinylchloride coated metal sheet at 150° to 250° C. so as to obtain a composite polyvinylchloride coated metal sheet.

4,929,172

STABLY OPERATING PULSE COMBUSTOR AND METHOD

Ben T. Zinn, Atlanta, Ga., and David Reiner, Haifa, Israel, assignors to Georgia Tech Research Corporation, Atlanta, Ga.

Filed Apr. 25, 1989, Ser. No. 343,084
Int. Cl.[5] F23C *11/04*
U.S. Cl. 431—1 **15 Claims**

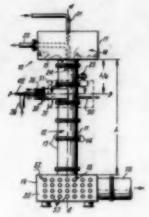
1. Method for stabilizing a pulse combustion process within a preselected volume of a pulse combustor, said pulse combustor having an elongated combustor body, an intake and an exhaust, and defining an interior combustion chamber, comprising the steps of:

(a) introducing secondary air axially into said combustion chamber;

(b) creating a fuel-air mixture by mixing fuel and primary air;

(c) introducing said fuel-air mixture tangentially into said preselected volume within said combustion chamber of said combustor body; and

(d) creating a combustion process by igniting said fuel-air mixture in said preselected volume within said combustion chamber, whereby said pulse combustion process occurs



within said preselected volume and combustion products are thereby created.

4,929,173

HEATING APPLIANCE WITH COMBUSTION AIR PREHEAT

Thomas G. M. Jacobs, Boxmeer, and Clemens J. M. De Vroome, Beugen, both of Netherlands, assignors to Stork Contiweb B.V., Netherlands

Filed Jan. 27, 1989, Ser. No. 303,484
Claims priority, application Netherlands, Jan. 29, 1988, 8800226
Int. Cl.[5] F23D *11/44*
U.S. Cl. 431—215 **5 Claims**

1. A heating appliance for a drier, comprising a combustion unit having a burner and a combustion chamber, wherein said combustion chamber comprises an elongated first portion, extending away from said burner and merging into an elongated second portion via a bend of 180°, said two portions and said bend defining a U-shaped path for combustion gases and said portions being approximately of equal lengths and said combustion chamber being provided with at least one discharge opening for discharging part of said combustion gases, said opening being located in said combustion chamber prior to said second portion and being controllable by means of a valve.

4,929,174

GAS LIGHTER WITH SPARK IGNITION

Ming-I Wang, No. 6, Lane 97 Hsi-Yuan Rd. Homei, Changhua, Taiwan

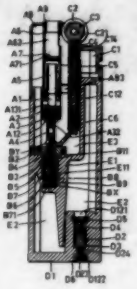
Filed Mar. 21, 1989, Ser. No. 326,793
Int. Cl.[5] F23Q *1/02*
U.S. Cl. 431—276 **4 Claims**

1. A lighter comprising a machine housing attaching thereto a nozzle assembly capable of providing a flame, an adjusting assembly capable of adjusting the flaming degree of said flame, a grinding assembly capable of providing a spark to enable said nozzle assembly to provide said flame, and a filling assembly capable of filling in said machine body a fuel gas for said flame, characterized in that said nozzle assembly includes:

a nozzle seat positioned in said machine housing and capable of mixing therein an air and a gas supplied from said fuel gas;

an accelerating piece connected to said nozzle seat and having a relatively small hole therethrough by which said gas to be mixed with said air is accelerated;

a burning tube secured to said machine housing, connected to said nozzle seat, and having an intermediate portion and an upper side hole capable of receiving therefrom said spark; and



a distrubing disk transversely secured in and to said intermediate portion to define thereabove a combustion chamber, having a plurality of holes evenly distributed around an axis of said burning tube, and capable of decelerating said mixed air and gas coming from said nozzle seat.

4,929,175

NONCONTROLLING TYPE VALVE

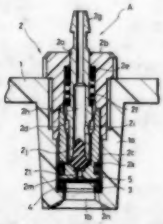
Tomio Nitta, Yokohama, Japan, assignor to Tokai Corporation, Yokohama, Japan

Filed Apr. 24, 1989, Ser. No. 342,199

Claims priority, application Japan, Apr. 27, 1988, 63-55863[U]

Int. Cl.[5] F23D *14/28*

U.S. Cl. 431—344 **2 Claims**



1. A noncontrolling type valve comprising: a recess formed in a top plate of a gas container, said recess having a through aperture in its bottom communicating with the inside of said gas container; valve means push-fitted in said recess; a through aperture in said valve means in alignment with said through aperture in said bottom of said recess; a valve in said valve means for opening and closing said through aperture in said valve means; and, a filter positioned in said recess below said valve means and between said through aperture in said valve means and said through aperture in said bottom of said recess for permitting a given constant flow of gas to pass to said valve means when said valve in said valve means is opened, said filter further comprises, in said recess, an annular spacer fixed to said filter and a net structure sandwiched between said filter and a bottom of said through aperture in said valve means.

4,929,176

NONCONTROLLING TYPE VALVE

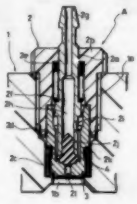
Tomio Nitta, Yokohama, Japan, assignor to Tokai Corporation, Yokohama, Japan

Filed Apr. 24, 1989, Ser. No. 342,209

Claims priority, application Japan, Apr. 27, 1988, 63-55864[U]

Int. Cl.[5] F23D *14/28*

U.S. Cl. 431—344 **8 Claims**



1. A noncontrolling type valve for a gas container having a top plate, a recess formed in said top plate and said recess having a through aperture in its bottom to communicate with the inside of said gas container comprising: a valve body push-fitted in said recess; and a filter positioned under said valve body for permitting a given constant flow of gas to pass to said valve body when said valve opens, characterized in that said valve further comprises, in said recess, an annular spacer of a synthetic resin fixed to an annular inside edge of an uppersurface of said filter, said valve body having a bottom end in contact with the remaining area of said uppersurface of said filter, said filter having an undersurface laid across said through aperture in the bottom of said recess, said valve further comprising, in said recess, an O-ring fitted around said bottom end of said valve body and pushed against an uppersurface of said annular spacer and an inner wall of said recess.

4,929,177

TRANSFER APPARATUS FOR LATERALLY TRANSFERRING KILN CARS BETWEEN TUNNEL KILNS

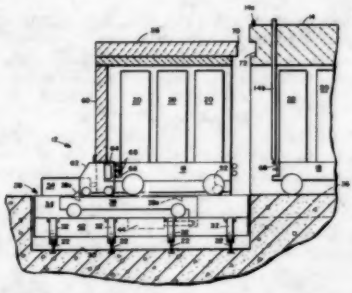
Ernst Paul, Kotz, Fed. Rep. of Germany, assignor to LINGL GmbH & Co. KG, Neu-Ulm, Fed. Rep. of Germany

Filed Nov. 10, 1988, Ser. No. 269,691

Claims priority, application Fed. Rep. of Germany, Nov. 13, 1987, 3738527

Int. Cl.[5] F27B *9/02*; F27D *3/00*

U.S. Cl. 432—11 **38 Claims**



1. A transfer apparatus for transferring a kiln car relative to a tunnel kiln, said transfer apparatus comprising:

(a) a transfer carriage including (i) a housing structure which

defines a space longitudinally alignable with an end of said tunnel kiln for accommodating a kiln car which is transferred form said tunnel kiln end and into said defined space of said housing structure, and (ii) a wall disposed within said defined space; and

(b) mounting means for mounting said wall relative to said housing structure for reciprocal longitudinal movements within said defined space between forward and rearward positions, said wall being farther from said tunnel kiln end when in said rearward position as compared to said forward position thereof so as to allow said transferred kiln car to be accommodated within said defined space.

4,929,178

METHOD FOR THE HEAT TREATMENT OF FINELY GRANULAR MATERIAL

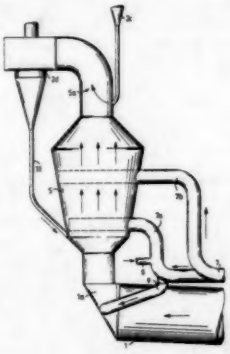
Hans-Dietmar Maury, Ahlen, and Wolfgang Buslowski, Ennigerloh, both of Fed. Rep. of Germany, assignors to O&K Orenstein & Koppel Aktiengesellschaft, Dortmund, Fed. Rep. of Germany

Continuation of Ser. No. 867,644, May 28, 1986. This application Dec. 19, 1988, Ser. No. 287,759

Claims priority, application Fed. Rep. of Germany, Jun. 4, 1985, 3520058

Int. Cl.[5] F27B *7/02*

U.S. Cl. 432—14 **2 Claims**



2. A method for the heat treatment of finely granular material, particularly for the production of cement, with a preferably multi-stage cyclone preheater, a rotary tubular kiln, a cooler as well as a single kiln off-gas line which is formed between rotary tubular kiln and cyclone preheater and is flow through substantially in upward direction by the off-gases of the rotary tubular kiln and to which tertiary air is fed in two partial streams for the combustion of an additional fuel from the cooler arranged behind the rotary tubular kiln on the material side, said streams being introduced at different heights into the kiln off-gas line; the method comprising the steps of:

feeding the additional fuel exclusively to the lower partial stream of the tertiary air to provide for sub-stoiciometric combustion in the off-gas line before the entrance of the second partial stream of tertiary air; feeding the second partial stream of the tertiary air free of fuel to affect a complete combustion of the additional fuel in the upper part of the kiln off-gas line;

directing the material to be treated, after the conclusion of the complete combustion of the additional fuel, to the kiln off-gas line above the second partial stream of tertiary air;

applying the precalcined material coming from the last stage of the cyclone preheater in countercurrent to the lower part of the kiln off-gas line below the partial stream of tertiary air which is charged with additional fuel; and

wherein

said step of directing provides for passing the material past entry points of the upper and the lower tertiary air streams into the kiln off-gas line; the method further comprising

a step of enlarging the diameter of a portion of the kiln off-gas line at the junctions with the two streams of tertiary air.

4,929,179

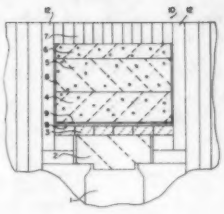
ROOF STRUCTURE

Dieter Breidenbach, Bochum-Stiepel; Hans Oldengott, Hamm, and Burckard Vitt, Lohmar, all of Fed. Rep. of Germany, assignors to Ruhrkohle AG, Essen, Fed. Rep. of Germany

Filed Oct. 17, 1988, Ser. No. 258,549

Int. Cl.[5] F27D *1/00*

U.S. Cl. 432—247 **14 Claims**



1. A roof structure comprising:

a plurality of layers of heat resistant material;

at least a first of said layers including a first brick layer;

said first brick layer including an upper surface;

said upper surface of said first brick layer being defined by a plurality of preformed refractory bricks disposed in a side-by-side manner;

at least a second of said layers above said first of said layers including a heat resistant compound;

said second of said layers extending across said roof structure;

said second of said layers including at least a portion of a said lower surface entirely supported by said first of said layers;

said lower surface of said second of said layers being generally supported at said upper surface of said first brick layer;

means for defining said lower surface of said second of said layers including said heat resistant compound of said second of said layers having been unshaped concrete when initially installed above said first brick layer of said first of said layers;

said first brick layer comprising support means for supporting said unshaped concrete at least when initially installed; and

said means for defining said lower surface of said second of said layers including said upper surface of said first brick layer.

4,929,180

STAY FULL-EASY LOAD "TURBO" PROPHYLACTIC POLISHING CUP

Ronald Moreschini, 2929 7th Ave., Pueblo, Colo. 81008

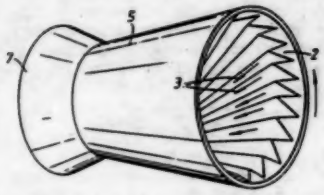
Filed Dec. 7, 1988, Ser. No. 281,321

Int. Cl.[5] A61C *3/06*

U.S. Cl. 433—166 **20 Claims**

1. A prophy cup for use with a prophy angle and dental polishing compound comprising: a conically shaped body member, attachment means at the smaller end of said body member, the larger end of said body member having a central opening cavity for holding said polishing compound, and a

plurality of internal turbine like vanes or ribs around the inside wall of said cavity, each vane or rib being at a slight angle towards the direction of intended cup rotation so as to hold said compound within the cup cavity during rotation and use thereof.

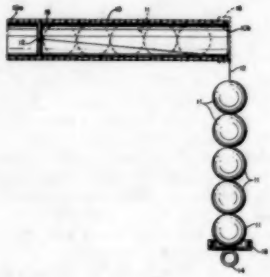


4,929,181

TOY & INSTRUCTIONAL APPARATUS

Becky A. Undlin, 14523-C 13th Avenue North, Plymouth, Minn. 55441

Filed Jul. 31, 1989, Ser. No. 386,994
Int. Cl.[5] G09B *19/00*; A63H *33/40*
U.S. Cl. 434—236 **12 Claims**



1. Toy and instructional apparatus comprising a hollow elongated member having open inlet and discharge ends,

a plurality of light weight elements inserted into the hollow member, and arranged in successive orientation within the hollow member,

flexible means connecting the elements, and

means connecting the flexible means to the hollow member but permitting the connected elements to be discharged from the discharge end of the member by blowing into the inlet end of the member.

4,929,182

MOUNTING CONSTRUCTION FOR ON-VEHICLE ELECTRICAL CONNECTION APPARATUS

Yukihiro Hyogo, and Akio Kurihara, both of Shizuoka, Japan, assignors to Yazaki Corporation, Tokyo, Japan

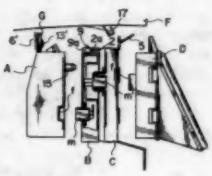
Filed Jul. 12, 1989, Ser. No. 378,672
Claims priority, application Japan, Jul. 13, 1988, 63-172576
Int. Cl.[5] H01R *33/00*
U.S. Cl. 439—34 **4 Claims**

1. A mounting construction of an on-vehicle electrical connection apparatus comprising:

a first electrical connection apparatus secured in a car body;

a second electrical connection apparatus electrically connected with said first electrical connection apparatus;

an instrument panel frame secured to a dash board and with means for temporarily holding said second electrical connection apparatus so that said second electrical connection apparatus opposes said first electrical connection apparatus; and



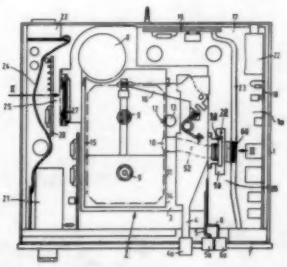
an instrument board mounted to said instrument panel frame, said instrument board being electrically connected to said second electrical connection apparatus by means of connectors.

4,929,183

DEVICE FOR ELECTRICALLY INTERCONNECTING ELECTRICAL AND/OR ELECTROMECHANICAL ASSEMBLIES, METHOD OF ELECTRICALLY INTERCONNECTING SUCH ASSEMBLIES, AND APPARATUS MANUFACTURED IN ACCORDANCE WITH THE METHOD

Klaus P. K. Rinneburger, Wilnsdorf, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 14, 1987, Ser. No. 73,680
Claims priority, application Fed. Rep. of Germany, Jul. 3, 1986, 3622355
Int. Cl.[5] H01R *9/09*
U.S. Cl. 439—67 **20 Claims**



1. A device for electrically interconnecting assemblies in a housing of an electrical apparatus, comprising:

a first assembly including a plurality of electrical components and a first connector element connected thereto by flexible electrical leads, and a second assembly including a second connector element disposed thereon, at least said first connector element being disposed in a hard-to-access area within said housing,

characterized in that said first assembly further comprises:

a holder on which said first connector element is arranged, said holder extending into a conveniently accessible area of said housing,

a support, and means for detachably aligning said holder to said support in an initial relative position, and

means for detaching said holder from said support by pressing said holder in a given direction, in response to relative movement of said holder in said given direction said holder being released from the support and said first connector element then engaging electrically with said second connector element.

4,929,184

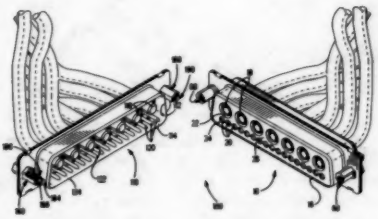
KEYED ELECTRICAL CONNECTORS WITH JACKSCREWS

Atahusain E. Emadi, Carlisle; Eric T. Green, Hummelstown; John S. Margosiak, Middletown; Daniel J. Mignogna, Harrisburg, and Dennis E. Smith, Elizabethtown, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 362,736, Jun. 7, 1989, Pat. No. 4,895,535. This application Aug. 30, 1989, Ser. No. 400,640

Int. Cl.[5] H01R *13/645*

U.S. Cl. 439—681 15 Claims



1. A keying and fastening system for matable first and second electrical connectors of the type having flanges of the housing means laterally of the terminal arrays where the flanges have a very small axial dimension, comprising key members and jackscrew members secured to housing means of first and second connectors matable together, the system being of the type wherein first key members of the first connector have axially oriented aperture means in body sections thereof within which said jackscrews are rotatable and forwardly from which extend threaded forward jackscrew shanks, and second key members of the second connector are adapted to threadedly receive thereinto the threaded forward jackscrew shanks to fasten together the matchingly keyed connectors after keying and mating thereof, the system comprising:

said first key members each have a keying projections extending forwardly to a leading end;

said second key members each have a keying projection cooperable with a said first key member keying projection, each said second key member keying projection extending forwardly to a leading end and having an aperture means extending thereinto from said leading end, said aperture means being threaded to correspond to said threaded forward shank of a respective said jackscrew for said jackscrew to threadedly engage said second key member during connector fastening upon rotation of said jackscrew; and

said first and second keying projection leading ends being chamfered at edges engageable with each other upon the leading ends meeting each other during connector mating, and said jackscrew leading ends being at least tapered peripherally therearound and shaped and positioned with respect to said first key member leading ends in a manner minimizing susceptibility of said jackscrew leading ends to being at least laterally stressed upon incidental engagement therewith by foreign objects,

whereby in mating, matchingly keyed connectors the key members relatively adjust their angular alignment for their keying projections to pass by each other during keying, and said jackscrew adjusts its angular alignment to enter the threaded aperture of the respective second key member and begin threaded engagement therewith almost immediately after said leading ends of said keying projections of said first and second key members begin to pass by each other, thereby overcoming possible slight relative angular misalignment of said jackscrews and said key members.

4,929,185

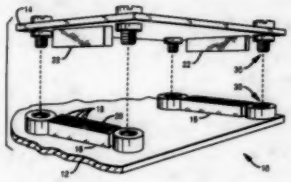
PRINTED CIRCUIT BOARD ASSEMBLY

Daniel T. Wong, West Columbia, and Floyd G. Speraw, Lexington, both of S.C., assignors to NRC Corporation, Dayton, Ohio

Filed Apr. 3, 1989, Ser. No. 331,915

Int. Cl.[4] H01R *9/09*

U.S. Cl. 439—74 23 Claims



1. A device for joining and separating first and second printed circuit boards connectable by a socket on one of said boards and a plurality of pins projecting from the other of said boards, comprising:

a screw held captive to said first board but rotatable therein;

means for preventing longitudinal movement of said screw relative to said first board; and

a spacer fastened to said second board and having a threaded hole for receiving said screw;

wherein said pins are inserted into and withdrawn from said socket by the engagement and disengagement, respectively, of said threaded hole by said screw.

4,929,186

CIRCUIT BOARD TERMINAL ASSEMBLY

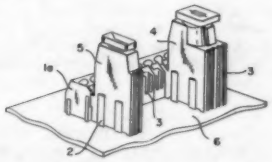
Ferdinand Steinkuhle, Paderborn-Wewer; Klaus Strate, Detmold; Willi Dürkop, Reinheim, and Ulrich Möller, Detmold, all of Fed. Rep. of Germany, assignors to C. A. Weidmüller GmbH & Co., Fed. Rep. of Germany

Filed Mar. 23, 1989, Ser. No. 327,698

Claims priority, application European Pat. Off., Mar. 26, 1988, 88 104910.0

Int. Cl.[5] H01R *9/09*

U.S. Cl. 439—78 4 Claims



1. An electrical terminal assembly, comprising

(a) a generally planar circuit board having electrical conductor strips arranged thereon in a predetermined configuration;

(b) a plurality of electrical terminal means mounted on said circuit board, said terminal means including

(1) at least one connector terminal adapted for electrical connection with at least one flexible-wire type electrical conductor and with said circuit board conductor strips; and

(2) at least one functional adapted for electrical connection solely with said circuit board conductor strips, whereby said functional terminal is selectively electrically connected with said connector terminal via said circuit board conductor strips; and

(c) each of said at least one connector and functional terminals including plural side walls containing interfitting

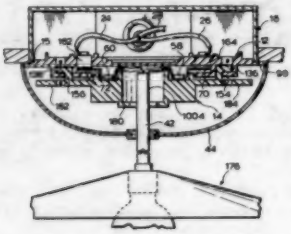
means for mechanically connecting adjacent terminals together whereby said connector and functional terminals can be joined to one another and also joined in rows of like ones of said connector and functional terminals.

4,929,187

LIGHT FIXTURE CONNECTOR

Trudy M. Hudson, and Henry R. Hudson, both of 10819 63 Avenue, Edmonton, Alberta, Canada (T6H 1P9)

Filed Apr. 12, 1989, Ser. No. 336,695
Claims priority, application Canada, Nov. 25, 1988, 584099
Int. Cl.[5] H01R *13/625*
U.S. Cl. 439—334 **19 Claims**



1. An electrical coupling device for detachably securing a fixture to an electrical junction box, said coupling device comprising male and female interconnecting components, said fixture being connected to said female component when said male component is secured to said female component by rotating one component relative to the other, said female component having a plurality of catches, said male component having a plurality of studs for insertion and engagement with said catches by way of rotational movement of said studs into said catches, said catches and studs being spaced apart in circular arrays at a first radius, the improvement comprising:

(1) at least two spaced-apart female resilient clips of electrically conductive metal, said clips being in a circular pattern at a second radius on said female component;

(2) said male component having at least two spaced-apart contacts of electrically conductive metal, said contacts being located in a circular pattern at said second radius;

(3) said male contacts being in register with said clips when said studs are in register with said catches,

rotation of said male component to engage said studs with said catches simultaneously engages said contacts with said clips to depress said clips slightly to ensure electrical contact.

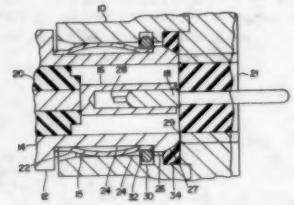
4,929,188

COAXIAL CONNECTOR ASSEMBLY

Gene Lionetto, Milford, and Stephen Brown, Derry, both of N.H., assignors to M/A-Com Omni Spectra, Inc., Merrimack, N.H.

Filed Apr. 13, 1989, Ser. No. 337,363
Int. Cl.[5] H01R *13/627*
U.S. Cl. 439—349 **7 Claims**

1. A micro-miniature coaxial connector comprising, in combination, a male half and a female half having facing surfaces, and an annular electrical spring contact member which functions to provide continuous annular outer conductor electrical contact and RFI suppression, wherein the annular spring member provides continuous annular outer conductor contact between facing surfaces at said male and female surfaces even during slight conductor misalignment, said spring being retained on said female member by a groove adjacent the outer end thereof, said outer end being tapered away from a collar defining the outer end of the groove towards its axis, an engaging diameter of outer end of said male connector half having a tapered surface adjacent to said tapered end of said female connector half to aid in aligning said halves when mating, said male member being at least 5% larger in diameter than the diameter of said female member adjacent the collar and said spring member extending at least 5% beyond the diameter of said collar; and a snap ring of larger outer diameter than said male surface and of smaller inner diameter than said collar



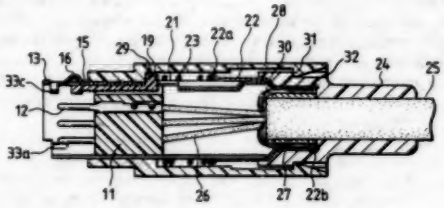
carried in a groove in said male surface into which the snap ring can expand when the female member is inserted into engagement with the male surface, said lock ring contrating into said groove behind the collar when said surfaces are in full engagement to lock said surfaces against axial movement.

4,929,189

CONNECTOR WITH LOCKING MECHANISM

Shigemi Sekiguchi, Kiryu, Japan, assignor to Hosiden Electronics Co., Ltd., Osaka, Japan

Filed Mar. 30, 1989, Ser. No. 330,534
Claims priority, application Japan, Apr. 13, 1988, 63-50105[U]
Int. Cl.[5] H01R *13/627*
U.S. Cl. 439—352 **10 Claims**



1. A connector with a locking mechanism comprising:

an elongated body of synthetic resin having contact pins therein, said body having a guide groove formed in its outer peripheral surface and extending in the lengthwise direction of said body;

a cylindrical metal cover which receives said body therein, said cover having a U-shaped groove cut in a forward portion thereof to define a tongue that is substantially in level with a peripheral wall of said cylindrical metal cover, said tongue having a front end portion which includes a radially outward locking protrusion and having a rear end portion which is connected integrally with said cylindrical metal cover;

an elastic piece of an elastic synthetic resin material which carries at a rear end thereof a drive member formed integrally therewith, said elastic piece being inserted into said cylindrical metal cover through a slot formed therein and being guided in said guide groove of said body so that said elastic piece is held in contact with the underside of said tongue in slidable relation relative to said tongue, said drive member being held in the outside of said cylindrical metal cover;

a metal shell mounted on a rear end portion of said cylindrical metal cover;

a coiled spring mounted around said cylindrical metal cover

and interposed between said drive member and said metal shell;

a bush of synthetic resin which is fixedly mounted on said metal shell for protecting a cable which is led out therefrom; and

a cylindrical unlocking member which covers said bush, said metal shell and said cylindrical metal cover, said unlocking member being engaged with said drive member for selectively shifting said elastic piece in a rearward direction.

4,929,190

INSULATION DISPLACEMENT CONNECTOR

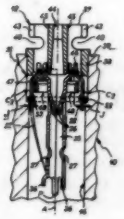
Jean-Louis Gonon, and Pierre Moulin, both of Saint-Marcellin, France, assignors to Arnould Fabrique d'Appareillage Electrique, Saint-Marcellin, France

Filed Oct. 12, 1988, Ser. No. 256,859

Claims priority, application France, Oct. 13, 1987, 87 14105; Jun. 24, 1988, 88 08509

Int. Cl.[5] H01R *4/24*

U.S. Cl. 439—409 **27 Claims**



1. An insulation displacement connector comprising an insulative material body and in said body a generally tubular metal contact member including inner and outer part-cylindrical shell members, said outer shell member being a floating shell member and extending circumferentially in cantilever fashion from a root generatrix, said floating shell member being elastically radially deformable relative to the root generatrix between a radially inward position in an unstressed condition of said connector and a radially outward position in a stressed condition of said connector, said inner and outer shell members having respective inner and outer lips, a slit being defined between said inner and outer lips and extending around at least part of the circumference of said contact member, and a barrel member rotatable about an axis of said connector and adapted to force an electrical conductor into said slit, there being peripheral clearance between said floating shell member and said insulative material body at least in the unstressed condition of said connector whereby the floating shell member permits the connector to accommodate electrical conductors of different diameters.

4,929,191

BATTERY CABLE CLAMP APPARATUS

Raymond A. Dufresne, 2937 E. Oraibi Dr., Phoenix, Ariz. 85024

Filed May 23, 1989, Ser. No. 355,404

Int. Cl.[5] H01R *11/26*

U.S. Cl. 439—429 **13 Claims**

1. Battery cable clamp apparatus for securing a cable to a battery post, comprising, in combination:

dielectric block means for covering the battery post, including

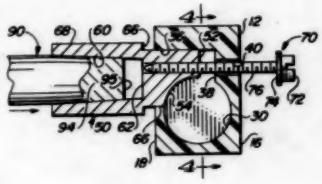
a dielectric block,

a first bore in the dielectric block for receiving a battery post, and

a second bore in the dielectric block intersecting the first bore;

conductive connector means extending into the second bore of the dielectric block means for connecting the cable to the battery post, including

a first connector bore for receiving a portion of the cable, and



an electrical contact portion extending into and movable in the first bore in the block and contacting the battery post to provide electrical contact between the connector means and the battery post; and

means for securing the conductive connector means to the dielectric block and to the battery post.

4,929,192

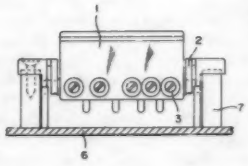
CONNECTION AND FIXING SYSTEM FOR ELECTRONIC UNIT

Gian Pietro Beghelli, Via J. Barozzi 6, Monteveglio (BO), Italy

Filed Jun. 29, 1988, Ser. No. 213,174

Int. Cl.[5] H01R *13/60*

U.S. Cl. 439—534 **6 Claims**



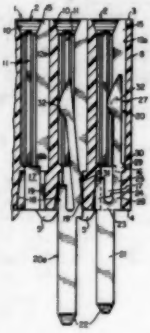
1. An electrical connection system comprising a first housing part provided with an electrically-operated device with terminals for supplying electrical power to said device, a second housing part adapted to be releasably connected to the first housing part, the second housing part including a connector for electrically connecting said terminals of said device to an electrical supply, the connector including electrical contacts for receiving said terminals and connections for leads from said supply, wherein said connector has a pivotal mounting on supports in said second housing part for selective pivotal movement of the connector between first and second pivotal positions respectively facilitating attachment of the terminals to said contacts and attachment of the leads to said connections, a third housing part in the form of a cover and adapted to be releasably connected to said first and second housing parts over the first housing part, so that the third housing part acts as a shield for at least the first housing part and the electrically-operated device, and fastener means for releasably connecting said first, second and third housing parts together.

4,929,193

CONNECTOR

Robert Taylor, Coventry, R.I., assignor to North American Specialities Corporation, N.Y.

Filed Nov. 22, 1988, Ser. No. 275,225
Int. Cl.[5] H01R *13/428, 13/73*
U.S. Cl. 439—567 **4 Claims**



1. A connector adapted to an interface between a printed circuit board and a circuit component or plug having a terminal pin, the connector comprising:

an insulating block including a channel which extends substantially the depth of the block between a top surface and a bottom surface of said block, said channel being sized to accept a pin of a connecting component or plug therein, the block further including a slot in a wall of said channel, the block further including a socket at an end of said channel at said bottom surface; and

a contact insertable through said bottom surface into said slot and being in said slot, said contact including a terminal end, a mounting section and a contact arm, the mounting section being sized to engage said socket of the connector block, said contact arm being sized for resilient retention in said slot, said contact arm including means for engaging a terminal pin disposed within said channel, said contact arm extending from the mounting section and including a projection which extends into the channel, a gap existing between the contact arm and a wall of said slot prior to insertion of a pin within the channel, the contact arm being resiliently disposed within the slot, each contact arm further including locking means extending from the contact arm which is matable with a corresponding step disposed in the slot in the insulating block to prevent removal of said contact from said insulating block through said bottom surface, said socket including a slanted wall and a vertical wall, and said contact having a short leg engageable with said slanted wall when said contact is placed in said socket, the vertical wall being engagable by a portion of the contact arm.

4,929,194

POST MEANS FOR USE WITH A MOLDED CONNECTOR

Iosif Korsunsky, Harrisburg, and Richard C. Schroepfer, Thompsontown, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

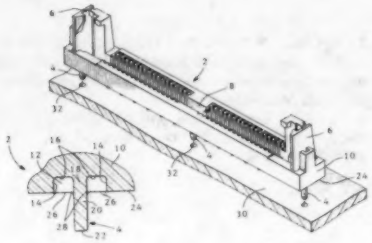
Filed Aug. 18, 1988, Ser. No. 234,362
Int. Cl.[5] H01R *13/13*
U.S. Cl. 439—571 **16 Claims**

1. A connector comprising:

a housing having a first surface and a second surface;

a cavity provided in the housing, the cavity extending from the first surface toward the second surface, the cavity having cavity side surfaces and a cavity bottom surface;

a projection provided proximate the cavity bottom surface, the projection extends from the cavity bottom surface toward the first surface, the projection extends beyond the first surface, such that a free end portion of the projection is provided beyond the housing, a midportion of the projection extends from the free end portion to a fixed end portion which is proximate the cavity bottom surface;



ribs which extend into the cavity, at a position which is proximate the first surface of the housing, the ribs extend from the cavity side surfaces toward the projection, ends of the ribs are provided adjacent the midportion the projection;

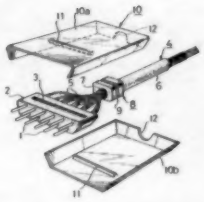
whereby as forces are applied to the free end portion of the projection, the midportion of the projection cooperates with the ribs so that the forces are distributed through the midportion, thereby preventing the failure of the projections.

4,929,195

SHIELD CONNECTOR

Masami Seidoh, Tokyo, Japan, assignor to Jupiter Dentsu Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 15,118, Feb. 17, 1987, abandoned. This application Oct. 14, 1988, Ser. No. 257,817
Claims priority, application Japan, Feb. 21, 1986, 61-22938
Int. Cl.[5] H01R *9/03*
U.S. Cl. 439—610 **1 Claim**



1. A shield connector for multi-core shield cable, said cable having an insulated coating, a shield coating, and a plurality of core wires, said connector comprising:

an insulated holding member on the end of said cable and having a plurality of contacting elements implanted therein, said plurality of core wires being connected to the contacting elements;

a stopper on the end of said cable, the stopper having an annular groove in the surface thereof and being formed integrally with the insulated coating;

a shield case on the end of the cable and covering the holding member and contacting elements, said case being formed by joining two shield case pieces, said case having

a hole therein, the edge of said hole engaging said annular groove of said stopper;

one of said shield case pieces being constructed to have outwardly flared sides, the other thereof being constructed to have inwardly narrowed sides, and when said pieces are engaged with each other, said case is formed to a tubular shape having a trapezoidal cross section;

an attaching flange surrounding the shield case pieces to hold them together and for securing the shield connector to a complimentary connector;

means for maintaining said case in position on said holding member, including an inwardly directed projection on at least one of said shield pieces and a recess in said holding member for receiving said projection; and

the attaching flange being formed around the shield case pieces and into the inwardly directed projection on at least one of the pieces so as to maintain the attaching flange on the pieces.

4,929,196

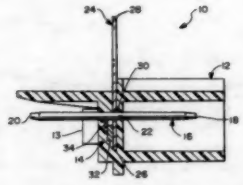
INSERT MOLDED FILTER CONNECTOR

Timothy R. Ponn, Aurora; Mark Gutierrez, Joliet, and Robert J. Gugelmeyer, Aurora, all of Ill., assignors to Molex Incorporated, Lisle, Ill.

Filed Aug. 1, 1989, Ser. No. 387,731

Int. Cl.[5] H01R *13/66*

U.S. Cl. 439—620 **15 Claims**



1. A filter connector having a plurality of electrically conductive terminals, a ground disposed in spaced relationship to the terminals and a plurality of capacitors, each said capacitor being electrically connected to the ground and to one of said terminals, wherein the improvement comprises:

a molded plastic housing defining a continuous unitary plastic matrix surrounding at least the capacitors, portions of the ground electrically connected to said capacitors and resilient generally "L" shaped electrically conductive connector means separate from said capacitors and said terminals for electrically connecting portions of the terminals to the capacitors, each said connector means having two legs generally perpendicular to each other, a side of one leg being electrically attached to a respective said capacitor and a side of the other leg being electrically attached to a side of a respective said terminal where the longitudinal axis of said other leg and said terminal are generally parallel to one another,

whereby the unitary matrix of plastic material simultaneously insulates and supports the capacitors, the ground, the terminals, and the connections therebetween.

4,929,197

HIGH DENSITY CONNECTOR

Robert E. Finney, Los Angeles, Calif., assignor to ITT Corporation, New York, N.Y.

Filed May 30, 1989, Ser. No. 357,832

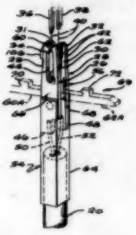
Int. Cl.[5] H01R *13/00*

U.S. Cl. 439—660 **15 Claims**

1. In a connector which has a plurality of contacts, the improvement comprising:

first and second dual-arm socket contacts, each having a forward mating end portion with a pair of arms for receiving between them a plug contact moving along a mating path, and a rearward end portion, said socket contacts lying primarily in a pair of spaced parallel planes;

a dielectric support having a spacer portion of about the same thickness as the space between the forward portions of said contacts, said spacer portion lying between said contacts;



said dielectric support having a rearward portion molded tightly to said contact rearward end portions, but said arms of said contact forward end portions being free to deflect apart and together independently of said spacer portions.

4,929,198

CONDUCTOR CONNECTION ASSEMBLY

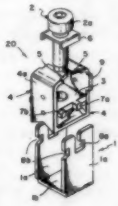
Rüdiger Strate; Rainer Schulze, both of Detmold; Michael Schnatwinkel, Herford; Georg Wagner, Oerlinghausen; Manfred Wilmes; Bernd Haller, both of Detmold; Ernst Herkner, Lemgo; Jörg Diekmann, Bielefeld, and Herbert Henning, Detmold, all of Fed. Rep. of Germany, assignors to C. A. Weidmüller GmbH & Co., Fed. Rep. of Germany

Filed Mar. 23, 1989, Ser. No. 327,604

Claims priority, application European Pat. Off., Mar. 26, 1988, 88104911.8

Int. Cl.[5] H01R *4/38*

U.S. Cl. 439—709 **9 Claims**



1. A conductor connector assembly, comprising

(a) a generally U-shaped receptacle adapted for receiving a conductor for connection with a bus bar, said receptacle including a bottom wall and a pair of opposed spaced side walls arranged normal to said bottom wall, said side walls each containing at least one recess having a vertically accessible offset portion; and

(b) means connected with said receptacle for clamping the conductor therein, said clamping means including

(1) a screw arranged between and parallel to said receptacle side walls and having a screw axis;

(2) a collar connected with said screw and having a configuration for insertion into said receptacle; and

(3) a nut threadably connected with said screw and including at least one lateral projection on and protruding from opposite sides thereof for insertion into said recep-

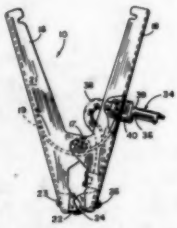
tacle wall recesses, respectively, whereby when said clamping means are initially vertically inserted into said receptacle and then laterally displaced in a direction normal to said screw axis without being rotated, said nut projections are arranged in said receptacle recess offset portions, and when said screw is tightened, said collar is displaced toward said receptacle bottom wall relative to said nut and said receptacle side walls to clamp the conductor against said receptacle bottom wall.

4,929,199

BATTERY CABLE CLIP AND CABLE CONNECTION

Donald C. McKinnon, Cheboygan, Mich., assignor to Ferret, Cheboygan, Mich.

Filed Jul. 13, 1988, Ser. No. 218,135
Int. Cl.[5] H01R *4/48*
U.S. Cl. 439—759 **4 Claims**



1. An automobile battery clip comprising:
a pair of substantially identical legs;
a pivot member joining said pair of legs;
a spring positioned about said pivot member and extending away from the pivot member toward the end of each of said pair of legs, which form a handle, to force the two opposite ends of said pair of legs into tight contact;
a pair of co-acting jaws fastened on the inner surface of the contacting ends of said legs with one jaw being connected to each of said legs so that said pair of jaws is normally biased in a tightly closed condition;
a cable clamp on one jaw of said pair of jaws; and
a heavy electrical conductor having one end held by said cable clamp and extending away from said clamp along the inside of one of said legs to an aperture formed in said leg approximately midway between the ends of said leg where said heavy electrical conductor is bent at approximately a 90° angle to pass through the aperture in a direction substantially orthogonal to the longitudinal axis of said leg.

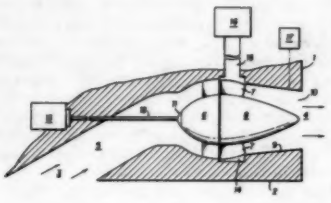
4,929,200

VESSEL PROVIDED WITH AT LEAST ONE WATER JET PROPULSION UNIT

Jean-Pierre Guezou, Athis-Mons, and Jacques Pichard, Meudon, both of France, assignors to L'Etat Francais, France

Filed Nov. 16, 1988, Ser. No. 272,013
Claims priority, application France, Nov. 16, 1987, 87 15782
Int. Cl.[5] B63H *11/00*
U.S. Cl. 440—38 **10 Claims**

9. A vessel provided with at least one water jet propulsion unit comprising a water intake at a tangent to the hull and a rear outlet for the water, an axial impeller, flow-correction guide vanes and a tail cone carried on the vanes which, together with a surrounding casing from the tail pipe, wherein the cross section area of water flow through the tail pipe is varied within narrow limits between the vanes and the outlet by a volume of gas introduced in the tail pipe by means comprising gas injection nozzle placed in the area of the vanes and connected to a means of supply of compressed gas.

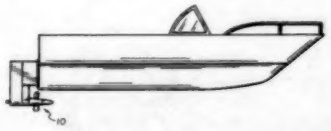


4,929,201

VARIABLE PITCH MARINE PROPELLER SYSTEM

Donald R. Pitt, Murray, Utah, assignor to Vari-Prop, Inc., Salt Lake City, Utah

Filed Apr. 6, 1987, Ser. No. 34,718
Int. Cl.[5] B63H *3/00*
U.S. Cl. 440—50 **11 Claims**



1. A variable pitch marine propeller system comprising: two removable symmetrical propeller blades with cylindrical bases each having a drive lug attached proximate the driving edge of the point of attachment of each blade, a sliding block activated by drive means mounted between the bases of the propeller with vertically aligned slots into which the drive lugs are inserted to hold said blades by the bases to align and simultaneously rotate the pitch of said blades in equal and opposite directions in response to movement of the sliding block;
a hub sub-assembly encasing the coupling means and bases of the blades and structured to journal mount and allow said blades to pivot and assume a forward or rearward pitch, and having a front end, and a rear end capable of mounting onto a drive shaft;
biasing means associated with the coupling means to initially position said coupling means in a position which holds said blades in a rear pitch configuration; and drive means associated with the sliding block to provide a predetermined fixed pressure on said sliding block to alter the biasing
means pressure and move said sliding block to a position which causes the blades to assume the desired forward or rearward blade pitch.

4,929,202

POWER TRIM CYLINDER PROTECTIVE LOCKING DEVICE FOR AN INBOARD/OUTBOARD BOAT MOTOR

John J. Tengelitsch, 13103 Red Bud Trail, Buchanan, Mich. 49107

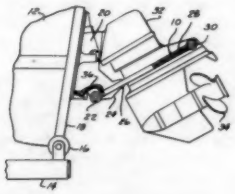
Filed Mar. 13, 1989, Ser. No. 322,646
Int. Cl.[5] F15B *15/26*
U.S. Cl. 440—55 **6 Claims**

1. A support device for maintaining an outboard unit of a boat engine in a tilted position for travel, said outboard unit having a stationary drive shaft housing attached to a boat transom, a movable propeller drive unit pivotally mounted

with respect to the stationary drive shaft housing, and trim means including a cylinder, a hydraulically operated piston, and an actuator rod engaged between the movable propeller drive unit and the stationary drive shaft housing for tilting the movable propeller drive unit to a desired angle between a lowered position and a raised position, the support device comprising:

a single-piece, elongated rigid plastic sleeve having a longitudinal axis and a radial slot extending along the entire longitudinal length of the sleeve; and

a semi-rigid styrofoam lining adhesively secured within the



sleeve extending along the entire longitudinal length of the sleeve; the lining having a longitudinal key-hole-shaped aperture in transverse cross section communicating with the radial slot through the sleeve, such that with the trim means in the raised position and the actuator rod extended, the sleeve is engageable over the actuator rod for supporting the movable propeller drive unit in the raised position for travel, wherein the sleeve engages against the cylinder at one end and against a pivot support of the actuator rod at another end, and the styrofoam lining substantially covers the actuator rod for protecting the actuator rod against nicks and abrasions.

4,929,203

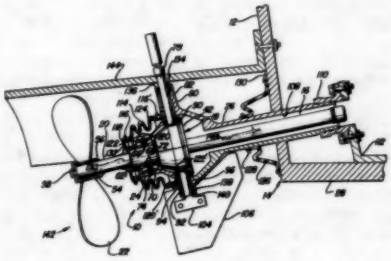
MARINE PROPELLER DRIVE SYSTEM

Steven C. Hahn, Mt. Clemens, Mich., assignor to GKN Automotive, Inc., Auburn Hills, Mich.

Continuation of Ser. No. 163,778, Mar. 8, 1988, abandoned. This application Aug. 22, 1989, Ser. No. 397,378

Int. Cl.[5] B63H *25/42*

U.S. Cl. 440—75 **25 Claims**



1. A marine propeller drive system for a boat having a power plant and a propeller comprising:

an inner propeller shaft having a first end connectable to said power plant and a second end;

a constant velocity universal joint having a first end connected to said second end of said inner propeller shaft, said universal joint having a second end articulatable with respect to said first end about an articulation axis;

an outer propeller shaft having a first end connected to said second end of said universal joint and a second end connectable to said propeller;

an inner thrust housing having a first end connected to said boat and a second end adjacent to said universal joint, said inner thrust housing enclosing at least a portion of said inner propeller shaft;

an outer thrust housing pivotably connected to said second end of said inner thrust housing about a vertical pivot axis coincident with said articulation axis, said outer thrust housing rotatably supporting said outer propeller shaft;

a thrust bearing connected between said outer propeller shaft and said outer thrust housing transferring the axial forces generated by said propeller on said outer propeller shaft to said outer thrust housing;

a skag plate connected to said outer thrust housing and pivotable therewith, said skag plate extending downward from said outer thrust housing and forward of said vertical pivot axis; and

means for angularly displacing said outer thrust housing with respect to said inner thrust housing about said vertical pivot axis.

4,929,204

WATER ENTRY PREVENTING STRUCTURE FOR INBOARD/OUTBOARD MOTOR

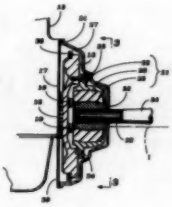
Shigeki Shiozawa, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Nippashi, Japan

Filed Aug. 19, 1988, Ser. No. 262,723

Claims priority, application Japan, Aug. 20, 1987, 62-206647

Int. Cl.[5] B63H *21/30*

U.S. Cl. 440—112 **17 Claims**



1. In a marine inboard/outboard drive comprising an engine adapted to be positioned within a hull and driving a propulsion device positioned externally of the hull and in which said propulsion device includes an input shaft that extends through the hull into proximity to said engine, said engine having an output shaft, and an elastic flexible coupling driven by said output shaft, said input shaft having a splined connection to said flexible coupling for driving said input shaft from said engine output shaft, said elastic flexible coupling having sufficient resilience to accommodate angular misalignment between said engine output shaft and said input shaft, the improvement comprising a housing affixed to said engine and completely enclosing said flexible coupling, said housing having an enlarged opening through which the input shaft passes, said enlarged opening being sufficiently larger than said input shaft to accommodate angular misalignment, and means for precluding leakage through said housing opening.

4,929,205

LEG IMMOBILIZER-DRAG FOR TRAINING SWIMMERS

Elene K. Jones, 1571 Hillview Dr., Sarasota, Fla. 33579

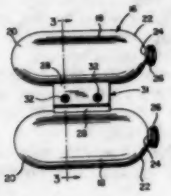
Filed Oct. 7, 1988, Ser. No. 254,720

Int. Cl.[5] A63C *5/00*

U.S. Cl. 441—60 **8 Claims**

1. A training leg immobilizing drag for swimmers, said drag including a pair of side-by-side elongated and laterally spaced

apart substantially rigid bodies joined by a thin connecting flange assembly extending therebetween, said bodies being streamlined in shape for longitudinal movement through water with little resistance, said connecting flange assembly being at least substantially rigid and at least substantially rigid with said bodies, said bodies including portions adjacent said connecting flange assembly of a cross sectional shape such that when said drag is held between closely adjacent thighs of a swimmer, with said bodies extending along said thighs and said connecting flange assembly passing between said thighs, the adjacent portions of said thighs are primarily seated against said adjacent portions of said bodies on opposite sides of said connecting flange assembly as opposed to being primarily seated against said connecting flange assembly, said bodies being hollow and including fluid ingress and egress ports having fluid tight closures removably associated therewith, said bodies including a pair of corresponding end walls and said ports being formed in said corresponding end walls of said bodies.

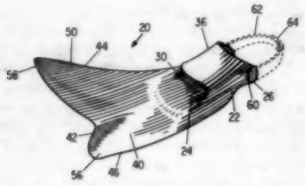


4,929,206

SWIM FIN WITH FLEXIBLE FIN MEMBER HAVING MOVABLE TIPS

Robert B. Evans, 28 Anacapa St., Santa Barbara, Calif. 93101

Continuation of Ser. No. 311,436, Oct. 14, 1984, abandoned.
This application Nov. 16, 1984, Ser. No. 662,443
The portion of the term of this patent subsequent to Aug. 15, 2006, has been disclaimed.
Int. Cl.[5] A63B *31/08*
U.S. Cl. 441—64 **10 Claims**



1. A swim fin adapted to be mounted onto a foot of a swimmer comprising

a foot receiving portion having a substantially planar base section terminating at one end thereof in an integrally downwardly extending heel section and terminating at the other end thereof in an open toe section which encloses only the upper portion of the foot;

an elongated flexible fin member formed of a resilient material and being integral with and extending from said substantially planar base section of the foot receiving portion, said elongated flexible fin member being generally trapezoidal in shape having a short end, a deflectable end, sloping sides and an upper surface and a lower surface with the short end thereof positioned adjacent the open toe section of said foot receiving portion and with the deflectable end thereof terminating in a pair of upwardly extending, symmetrically spaced movable tips, which are deflectable, said elongated flexible fin member having along a line normal to a center line extending substantially perpendicular between said short end and said deflectable end of the elongated flexible fin member a cross-sectional shape which varies its thickness from a center thickness to a relatively smaller thickness to define a valley in each side of the lower surface of the elongated flexible fin member and then back to a slightly greater thickness which then tapers from each slightly greater thickness to the thin edge of each of the sloping sides of said elongated flexible fin member;

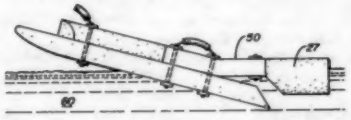
said elongated flexible fin member being responsive to a force being urged against the lower surface thereof to flex its deflective end including the movable tips formed thereon through an arcuate shaped path towards the open toe section and being responsive to an abrupt reversal in the urging force from the lower surface to the upper surface to immediately deflect the deflectable end of said elongated flexible fin member toward said heel portion of said foot receiving portion which moves said movable tips along an arcuate shaped path as the deflectable end is urged towards said heel section causing the movable tips to exhibit a snapping action wherein the movable tips abruptly reverse direction and extend toward the heel section of the foot receiving portion wherein the combination of the deflection of the deflectable end and the snapping action of the movable tips are capable of producing a propelling force as said elongated flexible fin member is subjected to abrupt reversal of forces on its upper surface and lower surface.

4,929,207

BODY SURFBOARD WITH ADDED FLOTATION

John A. Piatt, 226 Getchell St., Santa Cruz, Calif. 95060

Filed Feb. 16, 1989, Ser. No. 310,957
Int. Cl.[5] B63B *43/14*
U.S. Cl. 441—65 **3 Claims**



1. The method of adding buoyancy to a a body surfboard having front, side and rear edges, comprising the steps of:

providing a pair of buoyant float members which, when fixed to the surfboard adjacent the side edges thereof, are sufficiently small to allow a swimmer's upper torso to fit on the planar member between the float members;

drilling holes in said float members and said surfboard;

passing fasteners through said float members and surfboard and fastening said fasteners to hold the float members on said surfboard; and

including a buoyant extension fixed to each float member to extend past the rear edge of said surfboard and flex relative to the attached float member to add buoyancy and stability to the surfboard.

4,929,208

SURFBOARDS FOR DOING AERIALS

Joseph P. Corica, 2308 Altisma #222, Carlsbad, Calif. 92008

Filed Apr. 7, 1989, Ser. No. 334,344
Int. Cl.[5] A63C *15/00*
U.S. Cl. 441—75 **13 Claims**

13. The improvement in an elongated surfboard, comprising:

(a) an elongated flexible member having its ends secured in said surfboard to be pulled on by a surfer to press said

surfboard against his feet, said flexible member elongating under force and extending above the upper surface of said surfboard to a height convenient to be held by a surfer standing on said surfboard, said flexible member retracting when it isn't grasped by a surfer,

(b) the ends of said flexible member being disposed generally in the area of the surfboard upon which a surfer stands and

located rearward of the center of the surfboard longitudinally thereof and

(c) an elongated handle attached to said flexible member at each end of said handle and attached centrally of said flexible member to facilitate grasping by a surfer, said handle being pliable so as to give under the weight of a surfer lying on said surfboard.

4,929,209

METHOD OF AGING CATHODE-RAY TUBE

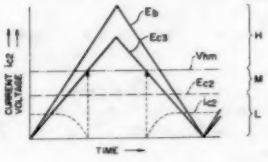
Teruo Matsuo; Tadayoshi Ihara, and Yoshinori Oyamada, all of Mobara, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 28, 1988, Ser. No. 225,352

Claims priority, application Japan, Sep. 18, 1987, 62-232158

Int. Cl.[5] H01J *9/00*

U.S. Cl. 445—6 **6 Claims**



1. A method of aging a cathode-ray tube having a cathode capable of emitting an electron beam, a first electrode for limiting said electron beam, a second electrode for accelerating electrons of the limited electron beam, a third electrode for focusing the accelerated electron beam and an anode, all being housed in an envelope, the method comprising the steps of:

energizing said cathode so that an electron beam is emitted therefrom with D.C. voltages applied to said first and second electrodes, the applied D.C. voltages being substantially equal to respective rated voltages for said electrodes; and

applying first and second voltages to said third electrode and said anode for a predetermined time, respectively, said first and second voltages being time-varying within first and second zones, each of said zones being between a first level lower than said D.C. voltage to be applied to said second electrode and a second level higher than the highest one of voltages on said third electrode with which an electric current flows in said second electrode with said electron beam emitted from said cathode, said first time-varying voltage being in phase with and lower than said second time-varying voltage, said first time-varying voltage varying so as to be at a level between said first and second levels at least for a part of said predetermined time.

4,929,210

CATHODE-RAY TUBE SUPPORTING RACK

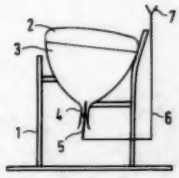
Walter Kornaker, Ulm, Fed. Rep. of Germany, assignor to Nokia Graetz, Pforzheim, Fed. Rep. of Germany

Filed Oct. 21, 1985, Ser. No. 789,717

Claims priority, application Fed. Rep. of Germany, Oct. 26, 1984, 3439198

Int. Cl.[5] H01J *9/50*

U.S. Cl. 445—73 **3 Claims**



1. A rack for supporting a cathode-ray tube during attachment of a faceplate and a bulb together with a glass solder while being moved through a continuous furnace comprising, purge gas tubing mounted to said rack including an exit portion extending into a neck portion of the bulb, the exit portion of the tubing which extends into the neck being flexible, said tubing including a free end positioned above the rack defining an inlet, said free end inlet configured to receive said purge gas blown thereinto.

4,929,211

HAND HELD TACTILE TOY

Susan D. Resnick, New York, N.Y., and Angela M. Nuyens, Nashville, Tenn., assignors to Softspot, Inc., Nashville, Tenn.

Filed Dec. 2, 1988, Ser. No. 278,905

Int. Cl.[5] A63H *33/00, 3/52;* **A63B** *11/08*

U.S. Cl. 446—14 **18 Claims**

1. A tactile relaxation object comprising a hard body sized to fit within an adult human hand and having a smooth surface containing at least one cavity, each said cavity containing and filled by a generally round, smooth resilient soft body, a substantial portion of which protrudes from and extends beyond

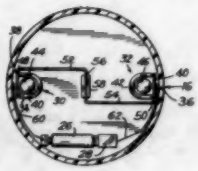
said smooth surface of the hard body and which comprises an outer elastomeric shell and an inner viscous fluid whereby an adult would be able to hold said tactile object and manipulate said soft body.

4,929,212

AERIAL TOY WITH ON-BOARD SIGNALING DEVICE

Shing-Lam Li, Tuen Mun, Hong Kong, assignor to Antibes, Inc., Monrovia, Liberia

Filed Jul. 27, 1989, Ser. No. 385,424
Int. Cl.[5] A63H *27/00*
U.S. Cl. 446—47 **8 Claims**



1. An aerial toy, comprising:

(a) a disc-shaped body having a central axis about which the body spins in a sustained flight when the body is hurled into the air, thereby generating centrifugal force;

(b) an actuatable, electrically-powered signaling means supported by the body, and operative for producing a distinctive signal when actuated;

(c) a battery supported by the body, and operative for supplying electrical power for the signaling means; and

(d) means for actuating the signaling means only during flight, including a pair of centrifugally-actuated electrical switches both located off the central axis on the body, both switches being switchable substantially simultaneously between first-switched states in which the battery is electrically disconnected from the signaling means, and second switched states in which the battery is electrically connected to the signaling means for actuating the same and producing said distinctive signal only during flight, said switches being mounted diametrically opposite each other and equidistant from the central axis, each switch including a stationary contact, a movable contact, and a pushing means for pushing a respective movable contact into engagement with a respective stationary contact under the influence of the centrifugal force, each movable contact being a resilient arm normally biased away from a respective stationary contact.

4,929,213

FLEXIBLE FOAM PICTURES

Richard H. Morgan, 134 S. Gain St., Anaheim, Calif. 92804

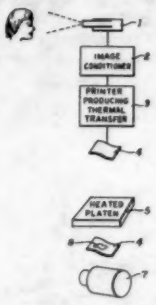
Filed Jun. 26, 1989, Ser. No. 371,625
Int. Cl.[5] A63H *3/16, 3/02, 3/36;* B41M *3/12*
U.S. Cl. 446—97 **4 Claims**

1. A method of creating a colored image on flexible plastic foam, comprising:

recording the image on magnetic tape by conventional videotaping methods, and

repeatedly scanning a single frame on a thermal transfer printer of the type in which wax is deposited on the surface of the flat transfer itself, and

placing the transfer against a formed three dimensional flexible plastic foam surface and pressing said foam surface flat and heating said transfer to cause the wax to migrate to the foam, and stripping the



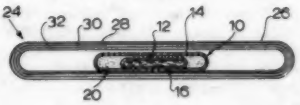
backing from the transfer, whereby the colored image is created on the formed flexible plastic foam surface.

4,929,214

INFLATABLE ENCLOSURE AND MEANS TO INFLATE SAME

Ron B. Liebermann, 2805 Lime Kiln La., Louisville, Ky. 40222

Filed Nov. 2, 1987, Ser. No. 115,372
Int. Cl.[5] A63H *27/10;* B63B *22/22;* B63C *9/12*
U.S. Cl. 446—221 **6 Claims**



1. An inflatable enclosure comprising:

(a) a fracturable first envelope;

(b) a first reactive component of a multi-component gas generating chemical system contained within said first envelope;

(c) a second non-inflatable, air permeable envelope in fluid-communication with said first envelope upon fracture of said first envelope wherein said first envelope is affixed inside the entire interior surface of the second envelope;

(d) a second reactive component of said gas generating chemical system contained within said second envelope; and

(e) a third envelope fabricated of a fluid-impermeable, gas-impermeable material surrounding said second envelope wherein said second envelope is affixed to the inside surface of the third envelope.

4,929,215

BALLOON SCULPTURING METHODS, APPARATUS AND PRODUCTS

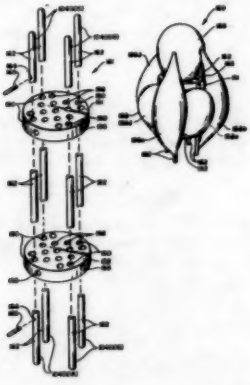
Craig J. Lovik, 8565 Custer School Rd., Custer, Wash. 98240

Division of Ser. No. 183,720, Apr. 19, 1988, Pat. No. 4,850,926.
This application Jun. 21, 1989, Ser. No. 369,657
Int. Cl.[5] A63H *3/06, 33/08;* A21B *1/00*
U.S. Cl. 446—226 **9 Claims**

1. A basic balloon building block for forming a balloon sculpture from at least one (1) balloon of the type having a constricted neck portion terminating at one end in an inflation aperture and at the other end in an imperforate inflatable sidewall, said basic balloon building block comprising, in combination:

(a) a skeletal frame-like balloon former including:

(i) a first disk-like coupling device having a plurality of peripherally spaced axial bores formed therein;
(ii) a second disk-like coupling device having a plurality of peripherally spaced axial bores formed therein; and,
(iii) a plurality of rigid rod-like former elements each having a first portion mounted within respective different ones of said plurality of axial bores in said first disk-like coupling device and a second portion spaced axially from said first portion mounted within respective different ones of said plurality of bores in said second disk-like coupling device, said plurality of rigid rod-like former elements and said first and second disk-



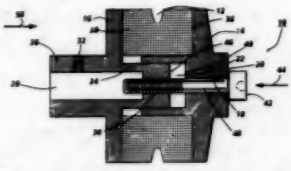
like coupling devices defining a plurality of outwardly facing open spaces therebetween; and,
(b) a first balloon positioned within said skeletal frame-like balloon former, said first balloon being inflated to a sufficient degree that said sidewall thereof is distended outwardly through said plurality of outwardly facing open spaces defined by said first and second disk-like coupling devices and said plurality of rigid rod-like former elements so as to form a plurality of outwardly extending, adjacent, abutting, bulbous lobes substantially overlying and concealing the intermediate ones of said rigid rod-like former elements and simulating the appearance of a plurality of balloons arranged in a cluster.

4,929,216
ROTATING RING AND CHARACTER TOY
Lamont C. Morris, Chicago; Wayne A. Kuna, River Forest, and Rouben T. Terzian, Chicago, all of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.
Filed Oct. 11, 1988, Ser. No. 255,763
Int. Cl.[5] A63H *11/08, 29/08, 5/00, 17/26*
U.S. Cl. 446—324 **16 Claims**

1. A toy comprising in combination:
a cylindrical ring having a central axis, an inner diameter, a cylindrical inner surface which is linear from edge to edge and an outside curved surface;
a character having two or more extremities with free ends;
the free ends being circumscribed by a circle of a diameter substantially equal to the inner diameter of the ring;
one of the ring or character being sufficiently flexible to permit insertion and removal of the character into and out of the ring while providing sufficient frictional engagement between the free ends and the inside of the ring to engage the character within the ring so that the character

rotates with the ring as the ring is rolled about its outside curved surface.

4,929,217
VARIABLE SPEED PULLEY
Rudolph Merbler, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.
Filed Aug. 1, 1989, Ser. No. 387,738
Int. Cl.[5] F16H *11/02*
U.S. Cl. 474—54 **11 Claims**



1. A variable speed pulley adapted to be mounted on a shaft, including:
a resilient member adapted to be located on the shaft and having an exterior surface adapted to support a belt thereon with the distance between the shaft center and the exterior surface of the resilient member corresponding to the pulley diameter; and
means for controlling the compression of said resilient member to adjust the position of the exterior surface of said resilient member to thereby increase or decrease the pulley diameter.

4,929,218
CONTINUOUSLY VARIABLE TRANSMISSION
Robert L. Clough, 44 Rochman Blvd., Scarborough, Ontario, Canada (M1H 1S2)
Filed Jul. 21, 1989, Ser. No. 383,017
Int. Cl.[5] F16H *9/00*
U.S. Cl. 474—83 **12 Claims**

1. A continuously variable transmission comprising:
two drive pulley members,
a first of the drive pulley members journalled for rotation about a first axis,

a second of the drive pulley members journalled for rotation about a second axis parallel to the first axis, spaced therefrom,

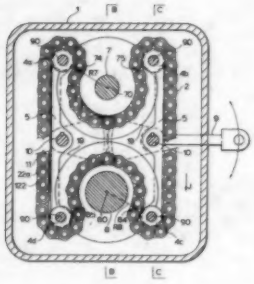
each drive pulley member having a circumferential groove therein between opposing, conical pulley interior side contact surfaces which diverge away from each other with increased radius from the axis of each drive pulley member,

the drive pulley members journalled on their axes with the groove of the first drive pulley member aligned with the groove of the second drive pulley member,

closed-loop chain means passing about the drive pulley members received in the groove of each drive pulley member to frictionally engage each drive pulley member and couple the drive pulley members together,

the chain means having side contact surfaces on opposite sides thereof,

the chain means engaging each drive pulley member with the side contact surfaces on one side of the chain means in contact with the pulley interior side contact surface on one side of each groove and with side contact surfaces on the other side of the chain means in contact with the drive



pulley interior side contact surface on the other side of each groove,

means permitting adjustable variation of the width of the chain means between its side contact surfaces over the length of the chain means,

releasable locking means to lock the width of the chain means over sections of the chain means in engagement with each drive pulley member,

control means to vary the width at which the locking means locks the width of the chain means about each drive pulley member,

wherein with variation of the width at which the locking means locks the width of the chain means about one drive pulley member, the side contact surfaces of the chain means engage the interior side contact surfaces of the one drive pulley member at varying radii from the axis of the one drive pulley member, and

wherein by variation of the width at which the chain means is locked about one drive pulley member relative to the width at which the chain means is locked about the other drive pulley member, the relative speeds of rotation of the drive pulley members are varied.

4,929,219

BELT LOCATOR FOR LOCATING A BELT ON A PULLEY

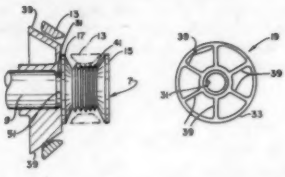
Gerald N. Baker, St. Louis, Mo., assignor to Emerson Electric Co., St. Louis, Mo.

Filed Jun. 16, 1989, Ser. No. 367,449

Int. Cl.[5] F16H *7/22*

U.S. Cl. 474—102 **10 Claims**

1. In a belt driven system employing a dynamoelectric machine to rotate a pulley on which is positioned a drive belt, the improvement comprising belt locator means for locating the belt on the pulley, the locator means being effective to locate the belt properly on the pulley if the belt is initially misinstalled with respect to the pulley, the dynamoelectric machine including a shaft on which the pulley is mounted, the belt locator means also being mounted on the shaft, the pulley being mounted on the outer end of the motor shaft and the locator means includes a collar mounted on the shaft inboard



of the pulley, the collar having a frusto-conical shape and a longitudinal central bore for mounting the collar on the shaft, the shaft being a stepped shaft having a larger diameter section on which the collar fits, a smaller diameter section on which the pulley fits and a transition section therebetween, the collar having a lip formed about an opening adjacent the outer end of the bore and conforming to the shape of the transition section thereby permitting the lip to fit over the transition section.

4,929,220

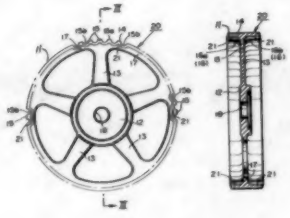
PULLEYS

Katsuaki Hosono, and Kenji Kushita, both of Niigata, Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 18, 1988, Ser. No. 233,434

Int. Cl.[5] F16H *55/30*

U.S. Cl. 474—152 **5 Claims**



1. A pulley comprising a rim including an outer peripheral surface having plural fillets circumferentially disposed thereon at equal angular intervals about an axis of said rim, an inner surface having a ridge portion circumferentially disposed on the center thereof so as to project radially inwardly, a hub having an aperture disposed at the center thereof so as to be coaxial therewith and connecting means connecting said hub and said rim, said rim having plural recesses circumferentially formed in said inner surface thereof at equal angular intervals about an axis thereof, each of said recesses disposed at a position of said inner surface opposite that of said fillet.

4,929,221

POWER TRANSMISSION TOOTHED BELT AND DRIVE

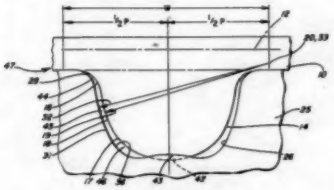
Hiroyuki Tanaka; Kuniharu Uto; Kazumi Kawai; Tsuneo Shaura, and Motonobu Yasuhuku, all of Kobe, Japan, assignors to Mitsuboshi Belting Ltd., Kobe, Japan

Filed Dec. 5, 1988, Ser. No. 280,589

Claims priority, application Japan, Nov. 12, 1987, 62-286842; Dec. 29, 1987, 62-335908

Int. Cl.[5] F16G 1/28

U.S. Cl. 474—205 21 Claims



1. A power transmission toothed belt comprising:

a belt body defining a longitudinal pitch line and an inner land line; and

a plurality of teeth projecting inwardly from said body, each tooth defining a centerline and being symmetrical about said centerline, each side of the tooth being defined by a convex radially outer root surface, an inner tip surface, and an intermediate power transmission surface, said power transmission surface defining a circular arc having a radius centered at a point spaced from said centerline approximately one-half the pitch of the teeth, and said radius having a length less than the pitch of the teeth.

4,929,222

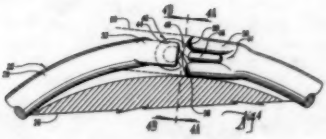
CONNECTABLE BELT AND METHOD FOR FORMING SAME

Thomas R. Smith, and Thomas M. Tripp, both of Newton, Iowa, assignors to Pyramid, Inc., Newton, Iowa

Filed Sep. 5, 1989, Ser. No. 402,557

Int. Cl.[5] F16G 3/00

U.S. Cl. 474—255 8 Claims



1. A connectable drive belt comprising:

an elongated thermoplastic elastomer member having a central portion, a first end portion, and a second end portion, said central portion being circular in cross section and having a constant diameter along its length;

said first end portion having a cross-sectional first thickness and a cross-sectional first width of greater dimension than said first thickness;

said second end portion having a cross-sectional second thickness and a cross-sectional second width of greater dimension than said second thickness;

said cross-sectional first and second widths of said first and second end portions each being of a dimension at least as great as said diameter of said central portion;

said first and second end portions having a first hole and a second hole respectively extending therethrough in a direction perpendicular to said first and second crosssectional widths respectively;

clip means having a first loop extending through said first hole and a second loop extending through said second hole so as to retentively grasp said first and second end portions to join said first and second end portions together;

said first and second widths of said first and second end portions defining a cylindrical boundary;

said entire clip means being located within and spaced radially inwardly from said cylindrical boundary.

4,929,223

PACKAGING ALIGNMENT SYSTEM

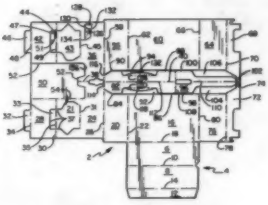
Joseph C. Walsh, Longmont, Colo., assignor to Adolph Coors Company, Golden, Colo.

Division of Ser. No. 830,356, Feb. 18, 1986, Pat. No. 4,722,437.

This application Jan. 11, 1988, Ser. No. 141,935

Int. Cl.[5] B31B 5/20, 3/26

U.S. Cl. 493—56 5 Claims



1. A method for aligned portions of a carrier blank while folding said carrier blank into a folded carrier comprising:

providing a relatively flat carrier blank having in a partially folded condition at least a first portion and a second portion joined together by a fold line with said first and second portions having oppositely facing generally planar surfaces when folded around said fold line so that said first and second portions are in superposed relationship;

forming an abutment tab in said first portion of said carrier blank, said abutment tab comprising at least one linear cut line and at least one fold line;

moving a portion of said abutment tab to a position projecting out of said generally planar surface of said first location to form a linear abutment edge from said linear cut line;

folding said carrier blank so that said first portion of said folded carrier blank has a first linear edge;

folding said carrier blank so said second portion of said folded carrier blank has a second linear edge adapted to be positioned in superposed and parallel relationship to said first linear edge;

providing a linear abutment edge on said second portion, said linear abutment edge in said second portion being parallel to said linear cut line;

said linear abutment edges in said first and second portions being parallel to said first and second linear edges;

producing relative folding movement between said first and second portions so that said linear abutment edge on said second portion and said linear abutment edge of said abutment tab are moved into contacting relationship; and

continuing said folding movement so that said linear abutment edges guide said first and second linear edges into a superposed and parallel relationship.

4,929,224

PLASTIC BAG FORMING MACHINE

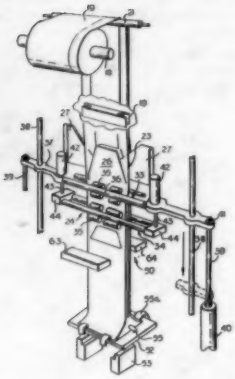
Violet Hanson, P.O. Box 163, Plainview, N.Y. 11803, and Ralph Johnson, Ridge, N.Y., assignors to Violet Hanson, Plainview, N.Y.

Continuation-in-part of Ser. No. 687,859, Dec. 31, 1984. This application Jun. 3, 1988, Ser. No. 202,695

The portion of the term of this patent subsequent to Jan. 9, 2007, has been disclaimed.

Int. Cl.[5] B31B *33/14*

U.S. Cl. 493—194 23 Claims



1. In a machine for making and folding open top flat bottom bags from a heat sealable material,

means on said machine supplying a continuous length of heat sealable material including means for feeding said material leading end first over a bag forming means,

sealing means operable, on passing of said leading end and beyond said bag forming means, to form a closure seal at the leading end of said material,

said bag forming means being operable to expand said material to form in the material opposed faces and opposed sides and a flat bottom for a bag including said opposed faces and sides,

material severing means operable to sever at a distance spaced from the leading end a length of said material to form the open top of the flat bottom bag and to form a closure seal for the next succeeding bag,

folding means operable in cooperation with said bag forming means to seal portions of the opposed sides to the flat bottom of the bag and to remove the severed length of material from said bag forming means while folding the flat bottom of the bag alongside at least a portion of the material severed, and

means selectively controlling the sequence of operations of said bag forming means, folding means, sealing means and severing means.

4,929,225

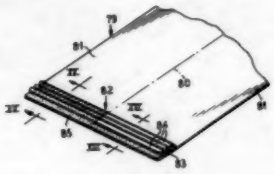
METHOD OF MAKING BAGS AND BAG MATERIAL HAVING HINGED ZIPPER STRIPS

Steven Ausnit, New York City, N.Y., and Hugo Boeckmann, Arlington Heights, Ill., assignors to Minigrip, Inc., Orangeburg, N.Y.

Continuation-in-part of Ser. No. 106,920, Oct. 6, 1987, Pat. No. 4,792,240, Ser. No. 75,636, Jul. 20, 1987, Pat. No. 4,787,880, and Ser. No. 812,467, Dec. 23, 1985, abandoned, said Ser. No. 106,920, is a continuation of Ser. No. 812,467, , said Ser. No. 75,636, is a division of Ser. No. 812,467,. This application Jun. 10, 1988, Ser. No. 205,331

Int. Cl.[5] B31B *1/90*

U.S. Cl. 493—213 16 Claims



11. A method of making a reclosable bag having a mouth end, and comprising:

providing said bag with opposite film walls having longitudinal formation axis;

applying an extruded plastic profiled reclosable fastener strip of continuous length lengthwise across the longitudinal formation axis of the film walls located at said mouth end of the bag, and the strip having a base web;

bonding said base web to the film walls with a lengthwise portion of said base web bonded to one of the walls at a location only above the centerline of profile means on the strip, and bonding another lengthwise portion of the base web to another of the walls both above and below said profile means; and

forming said walls with the fastener strip hereon into bag form with closed sides and closed bottom and said open end which is reclosable by means of said fastener strip.

4,929,226

PROCESS AND APPARATUS FOR PRODUCING AND CONVEYING PACK BLANKS

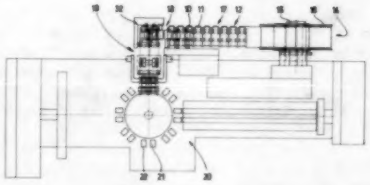
Heinz Focke, and Kurt Liedtke, both of Verden, Fed. Rep. of Germany, assignors to Focke & Co. (GmbH & Co.), Verden, Fed. Rep. of Germany

Filed Oct. 21, 1988, Ser. No. 261,041

Claims priority, application Fed. Rep. of Germany, Oct. 22, 1987, 3735675

Int. Cl.[5] B31B *1/16*

U.S. Cl. 493—343 11 Claims



1. In a process for producing pack blanks (10, 11) by tearing the blanks (10, 11) from a web of material conveyed in a conveying direction (12), said blanks being defined by perforations in the web which run only transversely relative to the convey-

ing direction in the web of material (12), the improvement comprising the steps of:

performing said tearing step by tearing off from the web of material (12) two of the blanks (10, 11), in succession in the conveying direction, as an attached unit (23);

then, severing the unit (23) into two individual blanks (10, 11) by exerting tensile force only in the conveying direction; and then simultaneously feeding the two severed blanks (10, 11), transversely to the conveying direction of the web of material (12), to a folding unit (20).

4,929,227

CENTRIFUGE DRUM FOR SEPARATING MIXTURES OF LIQUIDS

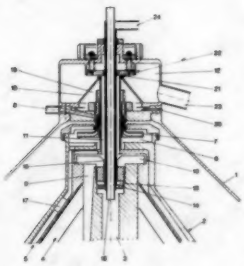
Karl-Heinz Zettler, Oelde, Fed. Rep. of Germany, assignor to Westfalia Separator AG, Oelde, Fed. Rep. of Germany

Filed Sep. 23, 1988, Ser. No. 249,048

Claims priority, application Fed. Rep. of Germany, Oct. 16, 1987, 3735031

Int. Cl.[5] B04B *1/04, 7/04, 11/08*

U.S. Cl. 494—41 **7 Claims**



1. In a centrifuge drum rotatable around an axis for separating refrigerated milk into cream and skim milk, comprising a stationary housing, an intake pipe secured to the stationary housing to supply refrigerated milk to a separation space in the centrifuge drum and a peeling disk for diverting the separated skim milk, a peeling chamber in which the peeling disk is positioned and that communicates through conveying channels with a peripheral portion of the separation space, a stationary interception chamber, and a diversion chamber between the separation space and the peeling chamber that communicates with a central portion of the separation space and has a diversion channel for diverting cream into the stationary interception chamber, the improvement wherein the peeling chamber is positioned axially between the diversion chamber and the interception chamber and the diversion channel is positioned concentric with the axis of rotation of the drum and rotatable therewith and wherein the diversion channel extends radially inwardly of the diversion chamber, through the center of the peeling disk and into the interception chamber and further comprising an intake chamber having an intake pipe and an overflow chamber positioned between the diversion chamber and the intake chamber, a peeling device in the overflow chamber and secured to the intake pipe and a channel communicating the peeling device with the atmosphere, the peeling device being arranged for directing liquid from the overflow chamber through the channel.

4,929,228

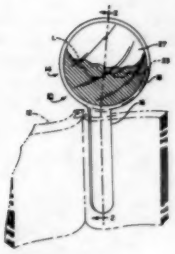
ANTI-MOTION SICKNESS APPARATUS

Katherine A. Hendricks, Chicago, Ill., assignor to Boris Tabakoff and John Newton, part interest to each

Continuation of Ser. No. 86, Jan. 2, 1987, abandoned, which is a continuation of Ser. No. 430,172, Sep. 30, 1982, abandoned. This application Sep. 17, 1987, Ser. No. 98,507

Int. Cl.[5] A61M *21/00*

U.S. Cl. 600—27 **1 Claim**



1. An anti-motion sickness apparatus for use in a moving vehicle, comprising:

vehicular motion simulating means responsive to motion of said vehicle for providing a visually discernible fluid motion image to create visually discernible orientation information for the user to confirm the inner ear information of the user, thereby preventing or at least greatly alleviating, the occurrence of motion sickness;

means for positioning at least a portion of said vehicular motion simulating means in the field of view of the user;

said vehicular motion simulating means including closed container means having a translucent portion, said container means confining a visually discernible fluid and permitting it to move freely therein as a result of the motion of the vehicle to provide a visually discernible fluid motion image, thereby generating visually discernible orientation information directly indicative of the motion of the vehicle, so that the user can view said fluid through said translucent portion thereof; and

said closed container means including walls having spaced-apart portions that enhance the movement of said fluid therebetween as the container means moves in unison with said vehicle to create thereby the wave motion image, and said vehicular motion simulating means including means for displaying aid visually discernible wave motion image.

4,929,229

BREASTPUMP HAVING IMPROVED VALVE MECHANISM

Karl O. A. H. Larsson, Lindenweg, Switzerland, assignor to ISG/AG, Switzerland

Filed Nov. 30, 1988, Ser. No. 278,047

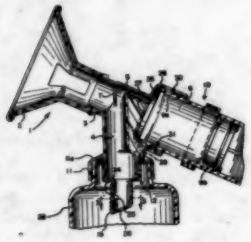
Int. Cl.[5] A61M *1/00*

U.S. Cl. 604—74 **6 Claims**

4. In a breastpump comprising a hood body for placement over a breast, the hood body having a main funnel-shaped portion within which the breast is received and a tubular extension extending downstream from the main funnel portion, means for connecting the tubular extension of the hood body with a vacuum line to periodically withdraw air from the hood body in a manner that draws the breast into the main funnel portion and thereby expresses milk from the breast into the tubular extension, the vacuum line connecting means including a sleeve having interior threads to which a vacuum pump is threadably attached in an airtight engagement, said sleeve threads being broken in places, a catch chamber for expressed

milk connected with the tubular extension, the catch chamber being located downstream from the tubular extension and having an inlet and an outlet which outlet communicates with a container to which the breastpump is attached in an airtight fit via a collared cap, the improvement comprising:

a valve mechanism having a housing including an upper portion removably attachable to said catch chamber outlet and a lower portion having a first widened opening defined through said lower portion adjacent a bottom to said lower portion through which first widened opening milk can pass, and a thin flexible membrane sized to cover and close said first widened opening when a negative pressure is applied within said housing and allow milk to pass through said first widened opening when said negative pressure is removed, said thin flexible membrane being generally circular in shape and removably mounted to said lower portion by a knob formed integral with and at the



center of said membrane, which knob is inserted into a second opening defined in said lower portion in a snap fit, said thin flexible membrane having bosses located on the side of the membrane that is outboard to said lower portion, said bosses overlying said first and widened opening and being of sufficient size to reinforce said thin flexible membrane to prevent said thin flexible membrane from being drawn into said first opening when said negative pressure is applied inside said housing member, and

a closed airflow path provided in said breastpump for forcibly moving said thin flexible membrane away from said first opening and purging milk from said lower portion, said airpath extending from the vacuum line through the tubular extension and catch chamber into said valve mechanism, then through said first opening into the container, then through a passageway in the cap extending between the cap and the sleeve, and out from the sleeve through the broken threads.

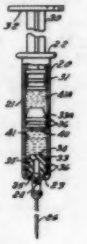
4,929,230

SYRINGE CONSTRUCTION

Frederick W. Pfleger, 1152 Barbara Dr., Cherry Hill, N.J. 08003

Filed Sep. 30, 1988, Ser. No. 252,792
Int. Cl.[5] A61M *5/22*
U.S. Cl. 604—90 **23 Claims**

1. A hypodermic syringe comprising; a cylindrical tube, an outlet port at one end of said tube, a resilient material pressurizing piston extending inwardly from the other end of said tube, a resilient material free piston located between said pressurizing piston and said outlet port, said pressurizing piston said free piston and said cylindrical tube forming a chamber, said chamber capable of holding contents, an external sealing surface on



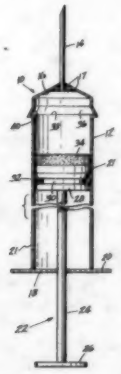
a first end of said free piston, said first end located capable of compressing by movement of said collapsible wall.

4,929,231

NON-REUSABLE HYPODERMIC SYRINGE

Mark A. Pawlikowski, Box 101D Wolf Neck Rd., Stonington, Conn. 06378

Filed Feb. 2, 1989, Ser. No. 305,708
Int. Cl.[5] A61M *5/00*
U.S. Cl. 604—110 **7 Claims**



1. A non-reusable hypodermic syringe comprising a syringe body having a front end, a rear end and an inner wall extending from said front end to said rear end, a needle extending from said front end, and a plunger assembly including a rod member having a rearward end extending from said rear end of said body and a forward end within said body and a head portion integral with said forward end of said rod member and having an outwardly facing circumferential groove and an O-ring seated in and protruding outwardly therefrom and engaging said inner wall of said body, said body having an inwardly facing circumferential groove adjacent said front end of said body and positioned to receive said O-ring therein when said grooves confront each other, thereafter to resist movement of said rod member in the direction away from said front end of said body and render said syringe non-reusable, said syringe further comprising a deflectable cap affixed to the face of said head portion confronting said front end of said body, said cap being subject to deflection by said front end as said outwardly facing circumferential groove approaches said inwardly facing circumferential groove, such that an administrator of an injection will sense a change in the action of said syringe and know

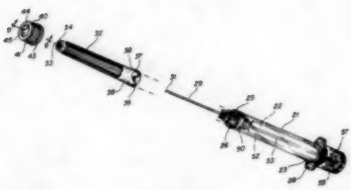
that slight further movement of said rod member toward said front end will bring said grooves into radial alignment.

4,929,232

SYRINGE HAVING TAMPER EVIDENCE FEATURES

Niall Sweeney, Rutherford, and Sandor Gyure, West Orange, both of N.J., assignors to Becton, Dickinson and Company, Franklin Lakes, N.J.

Filed Mar. 30, 1989, Ser. No. 330,676
Int. Cl.[5] A61M *5/00*
U.S. Cl. 604—111 **18 Claims**



1. A syringe assembly having tamper evidence features comprising:

an elongate barrel having a chamber for retaining fluid, said barrel including an open proximal end and a distal end;

a tip extending from said distal end of said barrel having a passageway therethrough in fluid communication with said chamber;

a needle cannula extending outwardly from said distal end, said needle cannula having a lumen therethrough in fluid communication with said passageway;

an elongate hollow needle shield having a longitudinal axis, a closed distal end and an open proximal end, said shield slidably engaging said tip and covering said needle cannula, said shield having an outwardly projecting shield lug having a cam surface;

a cup-shaped collar having an annular side wall, an open proximal end and a distal end having an aperture therethrough, said collar proximal end being adjacent to said distal end of said barrel, said needle shield projecting distally through said aperture, said aperture being sized and shaped so that said proximal end of said needle shield cannot pass therethrough, said collar including an inwardly projecting lug having a follower surface for contacting said cam surface of said needle shield, said cam surface and said follower surface being configured so that rotational force applied to said needle shield around said longitudinal axis causes said cam surface to contact said follower surface to apply a force to said follower surface; and

securement means for releasably holding said collar adjacent to said barrel, said securement means positioned so that force applied to said follower surface through said cam surface can disengage said securement means allowing said cam surface of said needle shield to move said collar and allowing said needle shield to be removed from said barrel.

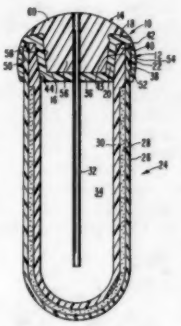
4,929,233

IMPLANTABLE FLUID IMBIBING PUMP WITH IMPROVED CLOSURE

Nathan Roth, San Francisco, and Su I. Yum, Los Altos, both of Calif., assignors to ALZA Corporation, Palo Alto, Calif.

Filed Aug. 26, 1988, Ser. No. 236,974
Int. Cl.[5] A61M *5/00*
U.S. Cl. 604—131 **26 Claims**

1. In an osmotically driven agent dispenser including an inner flexible bag adapted to contain the agent and having an open end, an intermediate layer of an osmotically effective solute composition at least partly encapsulating the bag, an outer shape-retaining membrane encapsulating the layer of osmotically effective solute composition, said membrane being at least in part permeable to water, and a port that extends from the interior of the bag to the exterior of the dispenser through which the agent may be charged into the bag and dispensed



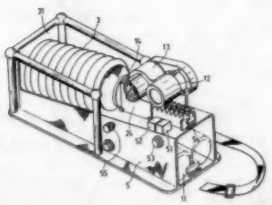
from the bag, the improvement comprising a locking snap-on closure for closing the open end of the bag, the closure having a biasing member for sealingly engaging the open end of the bag and a locking means preventing removal of the closure when the closure is in sealing engagement with the open end of the bag.

4,929,234

AUTOMATIC DRIP INFUSION SET

A-Ten Chen, 6, Lane 71, Min Hsing St., Taichung, Taiwan

Filed Mar. 30, 1989, Ser. No. 330,643
Int. Cl.[5] A61M *5/00*
U.S. Cl. 604—132 **3 Claims**



1. An automatic drip infusion set, including

a compressible drip bottle to be compressed by a push plate to let the solution contained therein be infused into patient's body;

a rack holder to receive a main rack and an auxiliary rack and to let the main rack be sliding therein, having a driving gear wheel mounted thereon at the top to drive the main and the auxiliary racks to move;

a main rack movably set in the rack holder, having a toothed portion made thereon at the top, said toothed portion being arranged in a length smaller than the length of the main rack so as to confine a flat front top end, a slide way made therein at the middle portion for sliding thereon of a small rack, a stop pin pivotally made at one side to slightly project into the slide way;

an auxiliary rack movably set in the slide way of the main rack, having a toothed portion made at the top, and a push plate connected at the front end; and

a driving gear wheel mounted in the rack holder at an upper

position to engage with the toothed portions of the main rack and the auxiliary rack, being driven by a motor through a speed variator to drive the main rack and the auxiliary rack to move forward or backward;

characterized in that the rotation of the driving gear drives the auxiliary rack to move forward to further let the tenon which is made at the rear end of the auxiliary rack be retained with the stop pin of the main rack so as to carry the main rack to move forward and to let the toothed portion of the main rack be engaged with the driving gear wheel.

4,929,235

SELF-SEALING PERCUTANEOUS TUBE INTRODUCER

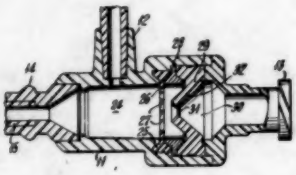
Jack D. Merry, Glens Falls, and E. David Fink, Schenectady, both of N.Y., assignors to Universal Medical Instrument Corp., Ballston Spa, N.Y.

Filed Jul. 31, 1985, Ser. No. 760,817

The portion of the term of this patent subsequent to Jan. 29, 2004, has been disclaimed.

Int. Cl.[5] A61M *5/00, 25/00*

U.S. Cl. 604—167 **13 Claims**



1. A self-sealing percutaneous tube introducer comprising a body having a passage therethrough adapted to receive a catheter or similar medical device, a flexible hole gasket mounted transverse to and within said passage having a round hole centered therein, a flexible slit gasket mounted transverse to and within said passage having a slit which permits said catheter to pass through by deflecting or stretching portions of the gasket adjacent said slit, and an inflexible spacing ring mounted between said gaskets, said slit gasket being spaced distally from said hole gasket but close enough that said slit gaskets if moved proximally by said catheter may reach and rest upon the perimeter of said hole, but not interfere with catheter movement.

4,929,236

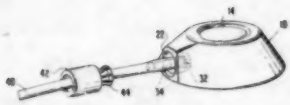
SNAP-LOCK FITTING CATHETER FOR AN IMPLANTABLE DEVICE

Edward J. Sampson, Carlisle, Mass., assignor to Shiley Infusaid, Inc., Norwood, Mass.

Filed May 26, 1988, Ser. No. 200,156

Int. Cl.[5] A61M *5/00*

U.S. Cl. 604—175 **25 Claims**



1. An access device for implantation comprising;

a housing with at least a first reservoir therein, a self-sealing septum to provide subcutaneous access to said reservoir, an outlet in fluid communication with said reservoir and having a barbed nipple therein, a catheter having one end slidably mounted over said barbed nipple, and a locking sleeve having a through-hole for slidably mounting onto said catheter, said locking sleeve having a series of radially movable fingers which slide over said barbed nipple and engage said housing while compressing said catheter thereby locking said catheter and said sleeve to said housing and provide, upon engagement, a sensory indication that locking has been achieved.

4,929,237

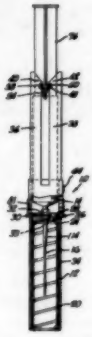
HYPODERMIC NEEDLE PROTECTION DEVICE

David Medway, 2401 H St., NW. #805, Washington, D.C. 20037

Filed Nov. 7, 1988, Ser. No. 268,242

Int. Cl.[5] A61M *5/32*

U.S. Cl. 604—198 **13 Claims**



1. A device for preventing exposure of a contaminated hypodermic needle comprising:

a housing unit having a larger proximal and smaller distal aperture for receiving a syringe and hypodermic needle attached to said syringe;

a syringe operatively engageable within and removable from said housing unit comprising a syringe chamber for containing liquid medicament or body fluid and a hypodermic needle having a base, said needle operatively engageable with and removable from said syringe;

spring means positioned at the distal end of said housing unit, said spring means engaging the base of said hypodermic needle, such that a pushing force applied to the proximal end of said syringe compresses said spring means and moves said syringe distally within said housing unit;

safety catch means for retaining said housing unit and syringe in engaged relationship in the absence of any pushing or retaining force applied to said syringe; and

locking means for selectively preventing relative movement between said housing and syringe and hypodermic needle when the hypodermic needle is in use with the spring means compressed,

whereby, when said pushing force is released said spring means extends and said syringe retracts proximally within said housing unit, retracting said hypodermic needle within said housing unit to prevent contact of said hypodermic needle with the operator of said device.

4,929,238

MULTI-PRESSURE INJECTOR DEVICE

Thomas M. Baum, Raleigh, N.C., assignor to Coeur Laboratories, Inc., Raleigh, N.C.

Filed Nov. 23, 1988, Ser. No. 275,272

Int. Cl.[5] A61M *5/00*

U.S. Cl. 604—208 **26 Claims**

1. A multi-pressure injector device, comprising:

an outer barrel attachable at a distal end thereof to a catheter or other fluid delivery means, and having at its proximal end laterally outwardly extending manual gripping means,

the outer barrel enclosing an interior volume fillable with a selected fluid;

an inner barrel/plunger longitudinally slidable in the outer barrel, the inner barrel/plunger having (i) an interior volume in open flow communications with the interior volume of the outer barrel, and (ii) at its proximal end, second laterally outwardly extending manual gripping means; and

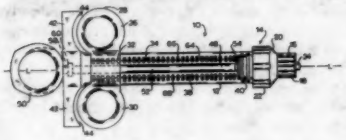
a second plunger longitudinally slidable in the inner barrel;

wherein:

the second plunger and the inner barrel/plunger are independently translatable relative to one another;

the inner barrel/plunger and the outer barrel comprise locking means for selectively longitudinally locking the inner barrel/plunger and outer barrel relative to one another within the outer barrel, to preclude longitudinal translation therebetween, the inner barrel/plunger and outer barrel being selectively longitudinally lockable relative to one another along substantially the entire length of travel of the inner barrel/plunger in the outer barrel;

the second plunger is longitudinally slidable in the inner



barrel/plunger while the inner barrel/plunger and outer barrel are locked relative to one another by said locking means;

the inner locking means is characterized in that the barrel/plunger comprises on an exterior surface thereof a track portion extending along substantially the entire length of the exterior surface, and wherein the outer barrel comprises, on an inner surface thereof, along a proximal portion of the interior surface, a track portion which is complementarily configured relative to the track portion on the outer wall of the inner barrel/plunger, for mating therewith, when the respective tracks on the outer barrel inner surface and inner barrel/plunger outer surface are brought into engagement with one another; and

the track portion on the outer surface of the inner barrel/plunger may be selectively engaged with or disengaged from the track portion on the inner wall of the outer barrel, by selective rotation of the inner barrel/plunger relative to the outer barrel, such that when the respective track portions on the inner barrel/plunger and outer barrel are not in engagement, the inner barrel/plunger is freely longitudinally slidable in the outer barrel.

4,929,239

DEVICE FOR FILLING THE MAGAZINE OF A SCALP CLIP APPLICATOR WITH C-SHAPED SCALP CLIPS

Karl Braun, Tailheim, Fed. Rep. of Germany, assignor to Aesculap-Werke AG vormals Jetter & Scheerer, Fed. Rep. of Germany

Filed Feb. 5, 1988, Ser. No. 152,762

Claims priority, application Fed. Rep. of Germany, Feb. 16, 1987, 3704759; Sep. 19, 1987, 3731613

Int. Cl.[5] **A63B** *17/04;* **B65H** *1/00;* **B31B** *1/00*

U.S. Cl. 606—142 **7 Claims**

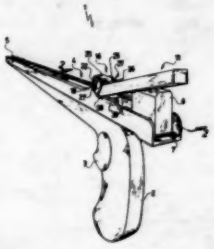
1. A device for filling the magazine of a scalp clip applicator with C-shaped scalp clips, comprising:

a feed container (**11**) for accommodating a row of scalp clips (**12**);

a scalp clip applicator (**1**) having a magazine (**4**) adapted to hold C-shaped scalp clips;

insert means (**17, 18, 19, 20**) provided on the magazine (**4**) for connecting the feed container with the magazine such that the scalp clips can be sequentially transferred from the feed container to the magazine, the insert means (**17, 18, 19**) on the magazine (**4**) forming a closeable insert opening;

at least one support (**20**) being formed on the magazine for supporting the feed container (**11**); and



a roll spring enclosed within a housing (**6**), said housing being mounted for displacement on the magazine (**4**) whereby the insert opening (**17, 18, 19**) can be opened and closed.

4,929,240

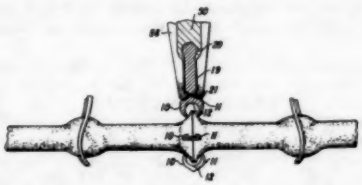
SURGICAL CLIP AND APPLIER

Wolff M. Kirsch; Yong H. Zhu, both of Albuquerque, and Robert B. Cushman, Cedar Crest, all of N. Mex., assignors to University of New Mexico, Albuquerque, N. Mex.

Division of Ser. No. 787,101, Oct. 15, 1985, Pat. No. 4,733,660, and a continuation-in-part of Ser. No. 556,917, Dec. 1, 1983, Pat. No. 4,586,503. This application Dec. 21, 1987, Ser. No. 135,445

Int. Cl.[5] **A61B** *17/12*

U.S. Cl. 606—151 **5 Claims**



1. A surgical clip for permanently joining apposed tissues, comprising

a bridge portion made of a plastically deformable material,

a pair of spaced arcuate arms extending generally parallel in one direction from opposite ends of said bridge, each of said arms having a concave surface facing the other arm, and said arms terminating at distal tips which are sufficiently rounded to avoid puncturing tissue captured therebetween,

a tang extending from said bridge in a direction opposite that of said arms,

a neck connecting said tang to said bridge,

said neck being breakable upon application of a predetermined tensile force to said tang,

a pair of spaced shoulders on said bridge portion, one on either side of said neck, for supporting said clip as tension is applied to said tang, to create a bending moment in said bridge for deforming the same,

said bridge being of such dimensions as to be plastically and permanently deformed by bending upon application to the tang of a force less than said predetermined tensile force while the clip is supported by a tool engaging its shoulders, said bending closing said arms around said apposed

tissues, said plastically and permanently deformed bridge retaining said arms in their closed positions after said tang is broken away.

4,929,241

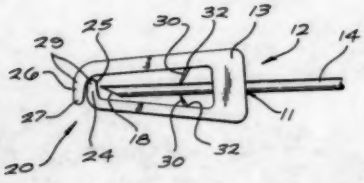
MEDICAL NEEDLE PUNCTURE GUARD

John C. Kulli, 30 Widewaters La., Pittsford, N.Y. 14534

Filed Aug. 5, 1988, Ser. No. 228,581

Int. Cl.[5] A61M *5/32*

U.S. Cl. 604—263 **19 Claims**



1. A safety guard for forming a protective barrier to prevent accidental puncture by a sharp tip of a used needle, said guard comprising:

means for mounting substantially the entire guard for sliding motion along the needle toward the tip; and

a front portion, secured to the mounting means and comprising a transverse shield, for collapsing to form a barrier in front of the needle tip, when the front portion is advanced past the tip.

4,929,242

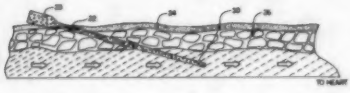
SOLUTION AND METHOD FOR MAINTAINING PATENCY OF A CATHETER

Vince C. Desecki, Ingelside, and Michael R. Prisco, Aurora, both of Ill., assignors to Baxter International Inc., Deerfield, Ill.

Continuation of Ser. No. 935,655, Nov. 26, 1986, abandoned. This application May 8, 1989, Ser. No. 349,948

Int. Cl.[5] A61M *5/325*

U.S. Cl. 604—266 **4 Claims**



1. A liquid for minimizing blood entry from a patient into a vascular access device, wherein said liquid has a density approximately equal to the density of whole blood of the patient and includes water, glycerol and NaCl in a proportion such that for each 100 ml of water the liquid includes approximately 23.87 grams of glycerol and approximately 900 mg of NaCl.

4,929,243

CATHETER COUPLING

Heinrich Koch, Lichtenau, and Jügen Fuchs, Emstal-Sand, both of Fed. Rep. of Germany, assignors to B. Braun Melsungen AG, Melsungen, Fed. Rep. of Germany

Filed Jan. 25, 1989, Ser. No. 301,438

Claims priority, application Fed. Rep. of Germany, Feb. 9, 1988, 8801583

Int. Cl.[5] A61M *25/02*

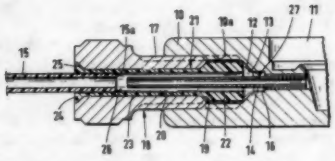
U.S. Cl. 604—283 **6 Claims**

1. A catheter coupling comprising:

a connecting member having a cavity and configured to receive an end of the catheter,

a thrust element having a pressure receiving shoulder and being configured to extend into the connecting member and defining a channel for the catheter, and

a compressible clamping member affixed to the thrust element, the clamping member having a head and a substantially tubular projection attached to the channel of the



thrust element, the head having an outer diameter and the tubular projection having an outer diameter, the outer diameter of the head being greater than the outer diameter of the tubular projection, the tubular projection extending beyond the pressure receiving shoulder in the channel of the thrust element,

whereby the head is compressed axially and the projection is deformed radially when the thrust element extends into the connecting member.

4,929,244

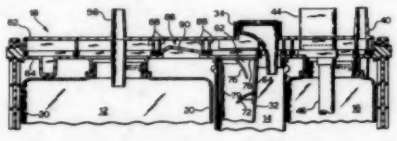
BAFFLE SYSTEM FOR USE IN UNDERWATER DRAINAGE DEVICES

David R. Swisher, St. Louis, Mo., assignor to Sherwood Medical Company, St. Louis, Mo.

Filed Sep. 2, 1988, Ser. No. 240,317

Int. Cl.[5] A61M *1/00*

U.S. Cl. 604—319 **22 Claims**



1. An underwater drainage device for removing liquids and gases from the body of a patient comprising,

a first collection chamber in flow communication with the body of a patient wherein fluid from the patient will be suctioned into the first collection chamber,

an underwater seal chamber having a predetermined amount of liquid therein and wherein the underwater seal chamber is in flow communication with the first collection chamber,

a source of negative suction pressure in flow communication with the underwater seal chamber,

a means for providing the flow communication between the first collection chamber, the underwater seal chamber and the source of suction,

said underwater seal chamber including a water seal column and an upper baffle chamber wherein, as the pressure in the first collection chamber decreases below the regulated suction pressure from the suction source, the liquid in the underwater seal chamber will be drawn upwardly through the water seal column into the upper baffle chamber,

the baffle chamber further having a volume greater than the predetermined volume of liquid capable of being drawn into the water seal column and said baffle chamber including a top and bottom end and opposed sidewalls,

a plurality of baffles spaced along and extending from the sidewalls of said baffle chamber to obstruct the flow of liquid through the baffle chamber, and

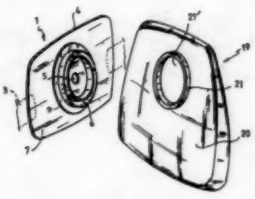
wherein the bottom end of said baffle chamber includes a baffle tube extending upwardly therefrom and having top and bottom ends aligned in flow communication with the water seal column wherein said bottom end of said baffle tube has a bottom opening therein having a larger area than the top opening on said top end of said baffle tube.

4,929,245

SAFETY DEVICE FOR OSTOMY BAG COUPLING SYSTEM

Henri Holtermann, Saint-Jean-De-Luz, and Claude Hamelin, Ascain, both of France, assignors to Laboratoires Biotrol, Paris Cedex, France

Filed Apr. 8, 1988, Ser. No. 179,629
Claims priority, application France, Apr. 10, 1987, 8705146
Int. Cl.[5] A61F *5/44*
U.S. Cl. 604—338 **12 Claims**



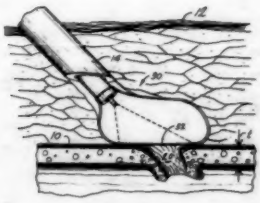
1. An ostomy bag system comprising a first assembly intended to be fixed about an artificial opening of a user's body by an appropriate fixing means, a second assembly including a body fluid and/or waste collecting bag intended to be removably fitted to said first assembly, said first assembly including a pad forming a cutaneous protector for the peristomeal zone, a first end-piece attached to said pad, said second assembly including a second end-piece operatively attached to the bag and adapted to interfit with said first end-piece and be immobilized with respect thereof when said first and second end-pieces are fitted together by a plurality of resiliently deformably snap-fit members provided on said first end-piece, and a rotary locking member rotatably attached to said first end-piece and rotatable between first and second positions for locking the position of said snap-fit members with respect to said second end-piece when in one of said first or second positions.

4,929,246

METHOD FOR CLOSING AND SEALING AN ARTERY AFTER REMOVING A CATHETER

Edward L. Sinofsky, Reading, Mass., assignor to C. R. Bard, Inc., Murray Hill, N.J.

Filed Oct. 27, 1988, Ser. No. 263,277
Int. Cl.[5] A61B *17/36*
U.S. Cl. 606—8 **14 Claims**



1. A method for closing and sealing a puncture at a puncture site in an artery located beneath the skin, after a medical device is removed from the puncture, comprising the steps of:

applying pressure directly to the artery at the puncture site, said pressure being sufficient to substantially close the puncture, the step of applying pressure including the steps of advancing a tube having an inflatable balloon at its distal end through overlying tissue to the puncture site, and inflating the balloon so that the balloon and the tube apply pressure to the puncture site; and

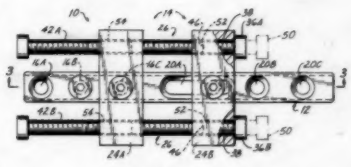
applying laser energy directly to the artery at the puncture site while pressure is applied, said laser energy being sufficient to thermally weld the artery at the puncture site.

4,929,247

BONE COMPRESSION AND DISTRACTION DEVICE

John M. Rayhack, 13919 Shady Shores Dr., Tampa, Fla. 33613

Filed Oct. 6, 1988, Ser. No. 254,158
Int. Cl.[5] A61F *2/00*
U.S. Cl. 606—53 **12 Claims**



1. A bone compression and distraction device for compressing or distracting the ends of a bone, comprising in combination:

a splint plate including a first and a second hole at one end and a third and a fourth hole at another end, said third hold comprising a slotted hole, said one end of said splint plate being positioned on one end of the bone and said other end of said splint plate being positioned on the other end of the bone;

a tensioning assembly including a first block seat on one end of said plate and a second block seated on said other end, respectively, of said splint plate and means for adjustably interconnecting said blocks, each said block comprising a transverse hole positioned therethrough;

first bone/block screw positioned through said transverse hole of said first block and through said first hole of said splint plate and threaded into the one end of the bone;

second bone screw positioned through said second hole of said split plate into the one end of the bone;

third bone/block screw positioned through said transverse hole of said second block and through said third hole of said splint plate and threaded into the other end of the bone;

fourth bone screw for positioning through said fourth hole of said splint plate and threaded into the other end of the bone after said tensioning assembly is operated;

fifth bone screw for positioning through said first hole in said splint plate and threaded into said one end of the bone after said first bone/block screw and said first block are removed from seated positioning on said splint plate; and

sixth bone screw for positioning through said third hole in said splint plate and threaded into the other end of the bone after said third bone/block screw and said second block are removed from seated positioning on said splint plate,

whereby said blocks may be rigidly secured to the respective ends of the bone with said splint plate therebetween and said tensioning assembly operated allowing said third bone/block screw to slide within said third hole of said splint plate to compress or distract the ends of the bone whereupon said fourth bone screw may be installed and then said first and third bone screws are removed with said blocks and replaced with said fifth and sixth bone screws.

4,929,248

SILK FIBER HAVING GOOD ABRASION RESISTANCE AND GOOD LIGHT RESISTANCE AND METHODS FOR THE PREPARATION THEREOF

Toshikazu Fuse, Nagahama; Atsushi Yamamoto, Hikone, and Junji Sano, Amagasaki, all of Japan, assignors to Kanebo Co., Ltd., Tokyo, Japan

Filed Apr. 27, 1988, Ser. No. 186,846

Claims priority, application Japan, Apr. 28, 1987, 62-103199; Feb. 19, 1988, 63-35126

Int. Cl.[5] D06M *3/02, 13/00*

U.S. Cl. 8—128.1 10 Claims

1. Silk fiber crosslinked with an epoxy compound having at least two epoxy groups wherein the solubility of the silk fiber is at most 30% by weight when the silk fiber is soaked in an aqueous 5 wt.% sodium hydroxide solution at a temperature of 65° C. for 60 minutes, and dyeing depth, K/S, at 520 nm with 9% owf. of a red reactive dye, Color Index Reactive Red 63 at the temperature of 60° C. for 60 minutes is at most 7, prepared by treating a silk fiber with an aqueous solution containing a water-soluble epoxy compound and a catalyst selected from the group consisting of alkali metal and alkali earth metal salts of dicarboxylic acids, tricarboxylic acids and amino polycarboxylic acids, 2-methyl imidazole, triethylenetetramine, 2,4,6-tris (dimethylaminoethyl) phenol and magnesium chloride and then subjected to heat treatment at a temperature range of 50° C. to 150° C.

4,929,249

DISCHARGE AND DISCHARGE RESIST PRINTING USING AMINOREDUCTONES

Peter Lechtken, Frankenthal, and Peter Kutschera, Ludwigshafen, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

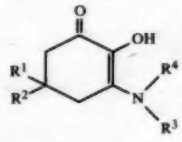
Filed May 4, 1989, Ser. No. 347,223

Claims priority, application Fed. Rep. of Germany, May 19, 1988, 3816999

Int. Cl.[5] D06P *5/15;* A61K *31/47*

U.S. Cl. 8—464 4 Claims

1. A process for printing a textile material made of polyester, triacetate, acetate or polyamide or a mixture thereof with a disperse dye by the discharge printing or discharge resist printing technique, which comprises using as the discharging agent a 3-aminoreductone of the general formula



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where R^1, R^2 and R^3 are identical or different and each is hydrogen, methyl or ethyl and R^4 is linear or branched alkyl or alkenyl of from 1 to 20 carbon atoms, which may be monosubstituted or polysubstituted by hydroxyl, alkoxy of from 1 to 3 carbon atoms in the alkyl or acetoxy, or is a radical —(C-H_2—CH_2—O)$_n$H where n is from 1 to 10 and which may be etherified with alkyl of from 1 to 3 carbon atoms or esterified with acetyl, or R^4 together with the N-atom is the radical of an aliphatic α- or β-amino acid of from 2 to 15 carbon atoms, where the carboxyl group may be present in neutralized form as an alkali metal, alkaline earth metal or ammonium salt or in esterified form as a C_1–C_{10}-alkyl ester, or a mineral acid salt thereof.

4,929,250

ULTRAVIOLET ABSORBING LENSES AND METHOD OF MAKING THE SAME

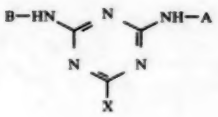
William M. Hung, and Kai C. Su, both of Alpharetta, Ga., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Mar. 14, 1989, Ser. No. 323,354

Int. Cl.[5] D06P *5/00;* C07D *251/00, 253/00*

U.S. Cl. 8—507 9 Claims

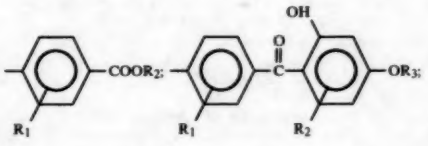
1. A process for preparing an ultraviolet radiation absorbing contact or intraocular lens material, comprising the steps of preparing an aqueous solution of effective amounts of a halotriazine reactive ultraviolet radiation absorbing agent and a base, wherein said reactive ultraviolet radiation absorbing agent is of the formula:

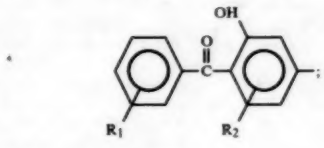


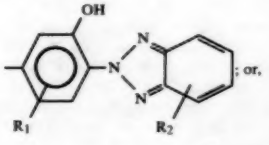
where

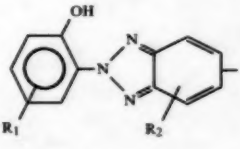
X=Cl or F;

A=an ultraviolet radiation absorbing component selected from the group consisting of





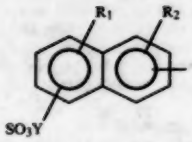




where

R_1–R_3 are selected from the group consisting of hydrogen, alkyl chains varying from C_1 to C_{18}, alkoxy, halogen, nitro, hydroxy, carboxy, sulfonic acid, or sulfonic acid salt substituents; and

B=an aqueous soluble moiety of the formula



where

Y is an amine salt or an alkali salt; and

R_1–R_2 are selected from the group consisting of hydrogen, alkyl chains varying from C_1 to C_{18}, alkoxy, halogen, nitro, hydroxy, carboxy, sulfonic acid, or sulfonic acid salt substituents,

maintaining said solution for a preselected period of time at a temperature up to at least 30° C.; adding a polymeric contact or intraocular lens material to said solution; said polymeric lens material having an exoskeletal functional group selected from the group consisting of hydroxyl, amino, amide and mercapto groups and removing said polymeric lens material from the solution after a preselected time.

4,929,251

METHOD FOR PRODUCING LEAD ACCUMULATOR WITH THIXOTROPIC GEL

Otto Jache, Am Molkenborn 73, D-6470 Budingen 1, Fed. Rep. of Germany

Continuation of Ser. No. 23,126, Feb. 13, 1987, abandoned. This application Feb. 3, 1989, Ser. No. 306,217

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1985, 3521200

Int. Cl.[5] H01M *10/10*

U.S. Cl. 29—623.5 **6 Claims**

1. Method for the production of a lead accumulator with a thixotrophic gel as an electrolyte that consists essentially of sulphuric acid and a gel former, comprising the steps of:

(a) impregnating the pores of active material in the electrodes and the pores of the separators that are arranged in relationship to the electrodes with a first electrolyte solution consisting essentially of sulphuric acid-based electrolyte that is free of gel former and which possesses a higher concentration of sulphuric acid than that which is present in the entire electrolyte after an equilibration of the concentration, and then;

(b) filling remaining free spaces between the electrodes including the remaining electrolyte spaces with a second electrolyte solution consisting essentially of sulphuric acid and a thixotropic gel former wherein said second solution possess a lower concentration of sulphuric acid than that which is present in the entire electrolyte after equilibration of the concentration.

4,929,252

FUEL

Donald D. Brillhart, 14713 Rockside Rd., Cleveland, Ohio 44137

Filed Jun. 15, 1989, Ser. No. 367,198

Int. Cl.[5] C10L *1/02*

U.S. Cl. 44—53 **3 Claims**

1. A method of making a fuel suitable for diesel engine use, comprising the blending of castor oil and an azeotrope of ethyl alcohol and water.

4,929,253

SULFURIZED OLEFIN - GLYCEROL MONOOLEATE ADDUCTS AND LUBRICANT COMPOSITIONS CONTAINING SAME

Angeline B. Cardis, Florence, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Aug. 3, 1988, Ser. No. 227,949

Int. Cl.[5] C10L *1/24*

U.S. Cl. 44—76 **27 Claims**

1. A process for preparing a multifunctional load carrying, antiwear and friction modifying liquid fuels additive which comprises reacting a sulfurized olefin with glycerol monooleate.

19. A liquid fuel composition comprising a major proportion of a liquid fuel and between 0.01 and 20 percent by weight of an additive which is the reaction product of a sulfurized olefin with glycerol monooleate.

4,929,254

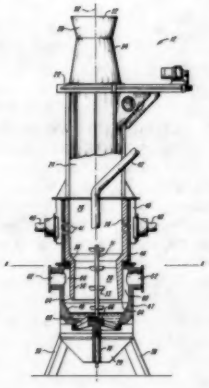
DOWN-DRAFT FIXED BED GASIFIER SYSTEM

Cornelis A. Kooiman, Rhoon, Netherlands, and John J. McDevitt, Sr., Bow, N.H., assignors to SET Technology B.V., Goes, Netherlands

Filed Jul. 13, 1989, Ser. No. 379,590

Int. Cl.[5] C10J *3/26, 3/42*

U.S. Cl. 48—76 **23 Claims**



1. A gasifier apparatus for obtaining combustible gaseous products from solid fuel materials comprising:

a plurality of vertically aligned, modular, interconnected chamber means for housing a gasification reaction including a hopper chamber disposed at a top portion of said gasifier, a drying chamber disposed below and in communication with said hopper chamber, an intermediate chamber disposed below and in communication with said drying chamber, and a lower chamber disposed below and in communication with said pyrolysis chamber;

radial air inlet means extending through an outer skin of said gasifier for directing air into said intermediate and lower chamber means to maintain the gasification reaction;

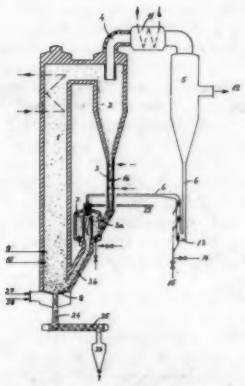
an annular flange means, integral with an inner refractory wall of said intermediate chamber and extending downwardly into a portion of said lower chamber, for defining a gas discharge pathway within said lower chamber, said gas discharge pathway defined by the outer wall of said flange and the inner wall of said lower chamber; and

first and second gas discharge conduits disposed at a top portion of said gas discharge pathway, said conduits disposed on opposite sides of said gasifier and offset by an angle of about 45° to 90° degrees from said radial air inlets.

4,929,255
METHOD FOR GASIFYING OR COMBUSTING SOLID CARBONACEOUS MATERIAL

Bertel K. Hakulin, Helsinki, and Jorma J. Nieminen, Varkaus, both of Finland, assignors to A. Ahlstrom Corporation, Noormarkku, Finland

Filed Aug. 23, 1988, Ser. No. 235,077
Claims priority, application Finland, Aug. 28, 1987, 873735
Int. Cl.[5] C01J *3/54*
U.S. Cl. 48—197 R **22 Claims**



1. A method of gasifying or combusting of solid carbonaceous material in a circulating fluidized bed reactor having a reactor chamber, and a particle separator connected to the reactor chamber; comprising the steps of:

(a) discharging gas resulting from the carbonaceous material from the reactor chamber to the particle separator;

(b) controlling the flow of gas in the reactor chamber at a level such that solid particles are discharged with gas from the reactor chamber to the particle separator;

(c) separating from the gas a major part of the solid particles entering the particle separator;

(d) returning the particles separated in step (c) to the reactor chamber;

(e) conveying gas with unremoved fine particles from the particle separator to a gas purification stage;

(f) separating the fine particles from the gas at the gas purification stage; and

(g) agglomerating the fine particles separated in step (e) with the particles separated in step (c), prior to step (d).

4,929,256
MULTI-DISC CUTTER AND METHOD OF MANUFACTURE

Mark R. Shepherd, Royston, England, assignor to AM International, Inc., Chicago, Ill.

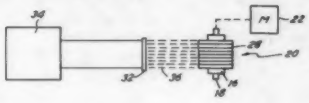
Filed Sep. 19, 1988, Ser. No. 246,225
Claims priority, application United Kingdom, Sep. 19, 1987, 8722085
Int. Cl.[5] B24D *3/00*
U.S. Cl. 51—293 **21 Claims**

1. A method of making an abrasive cutting tool having precisely controlled dimensions, comprising the steps of:

uniformly coating at least a portion of a cylindrical holder with a mixture of diamond powder and resin;

rotating said cylindrical holder about its longitudinal axis; and

exposing the rotating coating to an optical beam having an energy level less than the ablation threshold of said diamond powder and adapted for ablating the resin in said mixture so as to form a plurality of spaced annular depressions in said coating, each pair of successive depressions defining therebetween an abrasive cutting disc.



4,929,257
ABRASIVE COMPOSITION AND PROCESS FOR POLISHING

Kunihiro Miyazaki; Ken Ishitobi, both of Shiojiri, and Yosinobu Yamaguchi, Nagoya, all of Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo and Yamaguchi Seiken Kogyo Kabushiki Kaisha, Aichi, both of, Japan

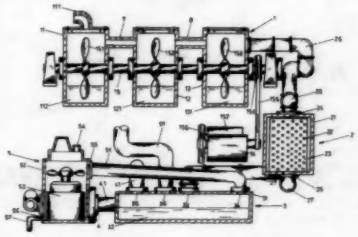
Filed Mar. 30, 1989, Ser. No. 330,581
Claims priority, application Japan, Apr. 8, 1988, 63-86490
Int. Cl.[5] B24D *3/02*
U.S. Cl. 51—309 **15 Claims**

1. A weak acid or neutral abrasive composition comprising an alpha alumina, a polishing accelerator of nickel sulfamate and/or sulfate, a surface modifying agent of about 0.1 to about 12% by weight of the composition magnesium nitrate, and water.

4,929,258
METHOD USED TO PURIFY SMOKE POLLUTANT

Wang Chin-Hua, No. 12, Ning An St., Sung Shan, Taipei, Taiwan

Filed Feb. 7, 1989, Ser. No. 307,610
Int. Cl.[5] B01D *47/12*
U.S. Cl. 55—86 **12 Claims**



1. A method of separating smoke pollutants from air, said method comprising:

providing a plurality of hollow tanks;

aero-communicatively connecting said hollow tanks in series;

partially filling each said hollow tanks with water, each said hollow tank substantially enclosing water, preventing circulation of the enclosed water to a location external to said hollow tank;

agitating the water in said hollow tanks to form droplets;

introducing the smoke-polluted air to a first of said hollow tank in series, the smoke pollutants being mixed and condensed with the droplets so as to purify the air before passing the air to the next hollow tank in series;

passing the purified air to a filter tank; and

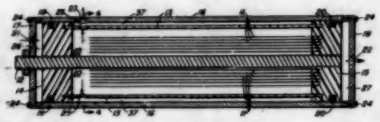
filtering the purified air in said filter tank to further remove smoke pollutants from the air.

4,929,259

HOLLOW FIBER MEMBRANE FLUID SEPARATION MODULE FOR BORESIDE FEED

Terrence L. Caskey, Concord; Johnny L. Trimmer, Antioch, and Janine L. Jorgensen, Clayton, all of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Filed Feb. 9, 1989, Ser. No. 309,756
Int. Cl.[5] B01D *53/22*
U.S. Cl. 55—158 **31 Claims**



1. A fluid separation module comprising:

A. a plurality of hollow fiber membranes, wherein the hollow fiber membranes are arranged in a bundle form and are adapted for the separation of one or more fluids from one or more other fluids;

B. a first tubesheet comprised of a thermoset or thermoplastic polymeric material at the first end of the bundle, arranged such that the hollow fiber membranes are embedded in the first tubesheet and communicate through the first tubesheet and are open on the opposite face of the first tubesheet;

C. a second tubesheet comprised of a thermoset or thermoplastic polymeric material at the second end of the bundle opposite the first end, arranged such that the hollow fiber membranes are embedded in the second tubesheet and communicate through the second tubesheet and are open on the opposite face of the second tubesheet;

D. a tubesheet support means which comprises a cylinder which encircles the bundle wherein a first end is bonded to or embedded in the first tubesheet, and a second end is bonded to or embedded in the second tubesheet;

E. a feed inlet means adapted for introducing a feed mixture of fluids to be separated into the bores of the hollow fiber membranes by contacting the feed mixture with the hollow fiber membranes at the opposite face of the first tubesheet;

F. a non-permeate outlet means adapted for removing the fluids, which do not permeate through the hollow fiber membranes, from the bore of the hollow fiber membranes at the opposite face of the second tubesheet;

G. means for removing the fluids which permeate through the hollow fiber membranes from the vicinity of the hollow fiber membranes;

H. a core, about which is arranged the hollow fiber membrane bundle, further arranged such that the core extends through and is bonded to the first tubesheet and the second tubesheet;

I. a feed inlet region adjacent to the opposite face of the first tubesheet arranged to form a cavity into which the feed inlet means introduces the feed mixture, wherein the region is sealed such that fluid can only enter or leave the region through the feed inlet means or the hollow fiber membranes, and the feed inlet region is arranged to introduce the feed fluid mixture into the bores of the hollow fiber membranes;

J. a non-permeate outlet region adjacent to the opposite face of the second tubesheet arranged to form a cavity into which the hollow fiber membranes introduce fluids which do not permeate the membrane, and from which the non-permeate outlet removes the non-permeating fluids from the module, wherein the non-permeate outlet region is sealed such that fluid can only enter or leave the region through the hollow fiber membranes or the non-permeate outlet means;

K. one or more means for channeling flow, such means arranged to channel flow of permeate in the longitudinal direction parallel to the core toward the permeate outlet, wherein the means for channeling flow have one end embedded in the second tubesheet and the second end placed at a short distance from the first tubesheet, said distance between the end of the means for channeling flow and the first tubesheet being sufficient to allow the permeate stream flowing along the means for channeling flow to flow to the permeate outlet means;

L. a casing means about the membrane module arranged to encase the entire hollow fiber membrane bundle and the two tubesheets;

M. a means for forming a seal between the first tubesheet means and the casing such that fluid cannot communicate between the feed inlet region and the region between the two tubesheets which is outside of the hollow fibers;

N. a means for forming a seal between the second tubesheet means and the casing such that gas cannot communicate between the non-permeate outlet region and the region between the two tubesheets which is outside of the hollow fibers;

O. a first end capping means arranged for sealing the end of the casing means at the end of the casing means near the first tubesheet, thereby forming the feed inlet region;

P. a second end capping means arranged for sealing the end of the casing means at the end of the casing means near the second tubesheet thereby forming the non-permeate outlet region;

Q. a first attachment means arranged for attaching the first end capping means to the casing means; and

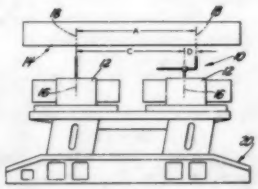
R. a second attachment means arranged for attaching the second end capping means to the casing means.

4,929,260

ADJUSTABLE AIR CLEANER FASTENING ASSEMBLY

David D. Bauerle, St. Clair Shores, Mich., assignor to Colt Industries Inc., New York, N.Y.

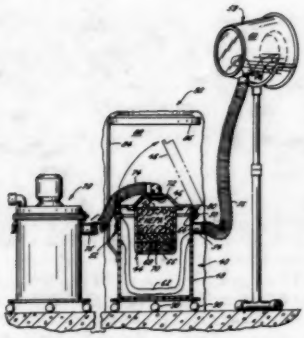
Continuation of Ser. No. 164,128, Mar. 4, 1988, abandoned. This application Oct. 11, 1989, Ser. No. 419,815
Int. Cl.[5] B01D *46/00*
U.S. Cl. 55—510 **8 Claims**



1. An adjustable air cleaner assembly interconnecting predetermined centers of an air cleaner cover and a carburetor on an engine, the centers being eccentric, said assembly comprising in combination base fastening means threadably engaging the predetermined center of a carburetor of an engine, said base fastening means comprising a base stud having a threaded portion at one end threadably engaging an aperture at the predetermined center of the carburetor and an enlarged head portion at the other end having a diameter greater than the diameter of said threaded portion, said enlarged head portion having an aperture communicating diametrically therethrough and being threaded, and cover fastening means engaging said base fastening means and the predetermined center of said air cleaner cover and adjustably maintaining a predetermined distance between the predetermined centers of the air cleaner cover and the carburetor, said cover fastening means comprising a cover stud being L-shaped and having a threaded portion at each end thereof, the threaded portion at one end of said cover fastening means being disposed in an aperture at the

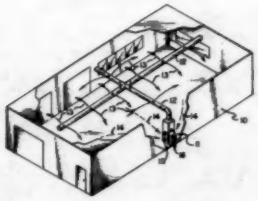
predetermined center of the air cleaner cover and the threaded portion at the other end of said cover fastening means being threadably engageable with said aperture.

4,929,261
HEPA FILTER MODULE
Earl B. Jacobson, 501 S. Shore Dr., Crystal Lake, Ill. 60014
Filed Mar. 28, 1989, Ser. No. 329,573
Int. Cl.[5] B01D *46/00*
U.S. Cl. 55—213 **7 Claims**



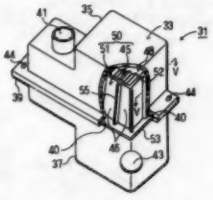
1. A HEPA-type filter, comprising:
a vacuum cannister body, having an inlet opening therein and adapted to contain a replaceable vacuum liner therein and a lid sealingly and pivotably mounted on an open portion of said cannister body;
said lid including an outlet opening therein and communicating with said inlet opening through a filter unit including at least a HEPA-type filter adjacent said outlet opening and two prefilters between said HEPA-type filter and said inlet opening to protect said HEPA-type filter, said prefilters mounted adjacent one another and said HEPA-type filter; and
and a fume hood having a wall depending over said cannister body to prevent hazardous materials from escaping to the environment when the liner is replaced.

4,929,262
DOWN DRAFT RE-CIRCULATING SYSTEM
John Balon, Jr., 25 Jefferson Rd., Bedford, N.H. 03102, and Richard J. Egan, 6 Springdale Rd., Manchester, N.H. 03103
Filed Dec. 17, 1987, Ser. No. 134,184
Int. Cl.[5] B01D *46/00*
U.S. Cl. 55—341.2 **4 Claims**



1. A down draft air recirculating filtration system for an enclosed space comprising in combination: a floor mounted filtration unit and a flexible fabric duct
receiving air from said filtration unit and adapted to distribute the same through a multiplicity of outlets across and just under the ceiling of said enclosed space; said filtration unit being adapted to intake air from the floor of said enclosed space and having a fan to propel said air and upstream of said fan at least three filter elements in series through which said air passes, the first of which is a course filter, the second of which removes 95% of all particles greater than 10 microns and the third of which removes 95% of all particles greater than 1 micron, the second filter element being comprised of crimped fibers of plastic fiber coated with tackifier and the third filter being a bag filter, said filter elements being readily removable and replaceable in said filtration unit, said filtration system creating a blanket of filtered air at said ceiling under positive pressure and a zone of lower pressure at said floor, which filtered air drifts downwardly to said floor and to said filtration unit.

4,929,263
AIR CLEANER
Joji Kasugai, Ichinomiya, Japan, assignor to Toyoda Gosei Co., Ltd., Nishikasugai, Japan
Filed Feb. 10, 1989, Ser. No. 308,681
Claims priority, application Japan, Feb. 26, 1988, 63-045311; May 27, 1988, 63-131163
Int. Cl.[5] B01D *46/10*
U.S. Cl. 55—502 **6 Claims**



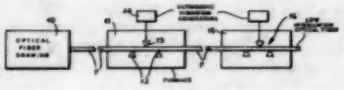
1. An air cleaner comprising:
a case formed continuously and integrally by blow molding, said case having an air inlet port, an air outlet port, a flange portion which divides said air inlet port and said air outlet port on the outer surface of said case, and a groove formed in said flange portion and opening into the interior of said case;
a filter arranged within said case; and
a filter holder on the outer peripheral edge of said filter for holding the shape of the filter, said filter holder being substantially non-deformable in a thickness direction thereof, the outer periphery of siad filter holder being in direct, airtight contact with the inner surface of said groove, said filter holder comprising a perpherical wall, a peripheral rib formed on the other surface of said wall and in air tight contact with the inner surface of said groove, and a connecting rib which connects said peripheral wall and the inner surface of said case.

4,929,264
APPARATUS FOR REDUCING OPTICAL-FIBER ATTENUATION
Pietro Di Vita, Turin, Italy, assignor to Cselt Centro Studi E Laboratori Telecommunicazioni S.P.A., Turin, Italy
Continuation-in-part of Ser. No. 266,734, Nov. 3, 1988. This application May 10, 1989, Ser. No. 349,992
Claims priority, application Italy, Nov. 5, 1987, 67942 A/87
Int. Cl.[5] C03B *37/15*
U.S. Cl. 65—12 **3 Claims**

1 An apparatus for reducing attenuation in an optical fiber, comprising:

means for heating an optical fiber to an elevated temperature below a softening temperature of the material of said optical fiber; and

means for vibrating said optical fiber while it is at said elevated temperature with an ultrasonic vibration to effect atomic redistribution in said optical fiber to a lower energy condition than the atoms possess prior to vibrating of said optical fiber, thereby reducing sizes of inhomogeneity domains in said material.



4,929,265

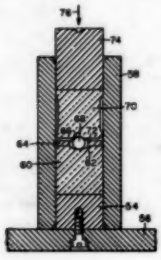
METHOD OF MOLDING GLASS OPTICAL ELEMENTS

Larry L. Carpenter; Robert J. Hagerty, both of Painted Post; Richard O. Maschmeyer, Corning; Mark L. Morrell, Horseheads, and Peter A. Schrauth, Elmira, all of N.Y., assignors to Corning Incorporated, Corning, N.Y.

Filed Mar. 8, 1989, Ser. No. 320,459

Int. Cl.[5] C03B *23/00*

U.S. Cl. 65—64 **40 Claims**



1. The method of molding a glass optical element having first and second opposed optical surfaces comprising the steps of

providing a first master defining a first master mold cavity adapted to form a first glass mold,

disposing a first quantity of glass mold material within said first master mold cavity,

molding a first glass mold having a first glass molding surface adapted to form said first optical surface,

providing a second master defining a second master mold cavity adapted to form a second glass mold,

disposing a second quantity of glass mold material within said second master mold cavity,

molding a second glass mold having a second glass molding surface adapted to form a second optical surface,

disposing said first and second glass molds in opposed cooperative relationship such that said first and second glass molding surfaces in part define a glass mold cavity having a predetermined volume,

disposing a predetermined quantity of glass optical element material within said glass mold cavity, and

molding said glass optical element having first and second opposed optical surfaces.

4,929,266

METHOD OF MANUFACTURING GLASS

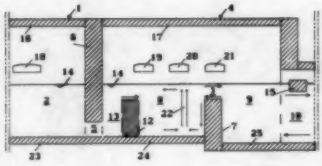
Daniel Cozac, Braine l'Alleud, and Jean-Francois Simon, Brussels, both of Belgium, assignors to Glaverbel, Brussels, Belgium

Filed Apr. 29, 1988, Ser. No. 188,553

Claims priority, application United Kingdom, Apr. 30, 1987, 8710298

Int. Cl.[5] C03B *5/225*

U.S. Cl. 65—135 **24 Claims**



1. A method of manufacturing glass wherein raw material is batch fed to a continuous glass-melting furnace which includes a melting tank connected by a submerged throat to a refining tank, the refining tank having an upstream refining cell and a downstream refining cell separated by a transverse sill, each of the upstream refining cell and the downstream refining cell having respective upstream ends downstream ends, and the downstream cell of the refining tank is connected to a conditioning tank, said method comprising the steps of:

a. melting the batch material in the melting tank to provide a melt;

b. passing the melt from the melting tank to the upstream refining cell of the refining tank via the submerged throat;

c. heating the melt in the upstream refining cell to thereby degas the melt, to thereby produce within the upstream refining cell a spring zone, which spring zone is a localized area of rising melt located towards the downstream end of the upstream refining cell, and to thereby produce within the upstream refining cell a circulation of melt which feeds the spring zone; and

d. delivering the melt of step c over the transverse sill into the downstream refining cell and subsequently into the conditioning tank.

4,929,267

PLANT GROWTH PROMOTION

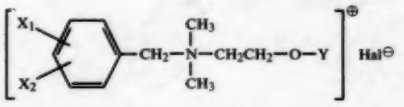
Akinori Suzuki, Chiba; Suong B. Hyeon, Uraws; Toshio Kajita, Yachiyo; Masakazu Furushima, Nagareyama; Shigeo Yoshinaka, Niigata; Takashi Suzuki, Niigata; Mitsunori Oda, Niigata, and Akinori Tanaka, Niigata, all of Japan, assignors to Mitsubishi Gas Chemical Company, Japan

Filed Dec. 8, 1986, Ser. No. 938,872

Int. Cl.[5] A01N *33/08*

U.S. Cl. 71—77 **6 Claims**

1. A method of promoting the growth of a plant, which comprises applying an effective amount of at least one active compound selected from the group consisting of agriculturally acceptable salts of compounds represented by the formula:



(I)

wherein Hal represents a chlorine, bromine or iodine atom, X_1 represents a hydrogen or chlorine atom, or a methyl, trifluoromethyl, nitro, methoxy or t-butyl group, and X_2 represents a hydrogen atom, or both X_1 and X_2 represent

a chlorine atom or a methyl group; and Y represents a hydrogen atom, or a C_{2-6} alkylcarbonyl, benzoyl, N-phenylcarbamoyl, N-3,4-dichlorophenylcarbamoyl, chloropropylcarbonyl, methoxycarbonyl, carbamoyl or methacryloyl group,

to the stalks, leaves, roots or seeds of the plant or to soil.

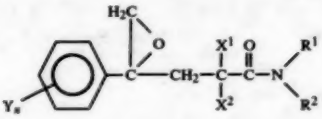
4,929,268

SUBSTITUTED OXIRANE COMPOUNDS

R. Garth Pews, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Mar. 27, 1985, Ser. No. 716,861
Int. Cl.[5] A01N *43/00*
U.S. Cl. 71—88 **18 Claims**

1. A compound of the formula



(I)

wherein

Y represents halogen, $—CF_3$ or methyl;

n represents an integer from 1 to 5, inclusive;

X^1 and X^2 independently represent chlorine, fluorine, bromine or iodine; and

R^1 and R^2 independently represent

hydrogen,

cyano,

loweralkyl,

cycloalkyl,

aryl,

aralkyl,

—COOR wherein R represents hydrogen or loweralkyl or

$—CONZ^1Z^2$ wherein

Z^1 and Z^2 independently represent

hydrogen,

cyano,

loweralkyl,

cycloalkyl,

aryl or

aralkyl.

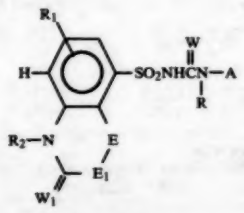
4,929,269

HERBICIDAL SULFONOMIDES

Keith G. Watson, Blackburn; Peter Drygala, Niddrie, and Stephen Bell, Vale, all of Australia, assignors to ICI Australia Operations Proprietary Limited, Melbourne, Australia

Filed Oct. 19, 1988, Ser. No. 259,762
Claims priority, application Australia, Oct. 20, 1987, PI4989
Int. Cl.[5] C07D *401/12, 403/12, 417/12;* A01N *43/54*
U.S. Cl. 71—92 **10 Claims**

1. A compound of formula I and the salts thereof



wherein

W and W_1 are independently O or S;

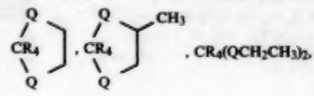
E is O, $S(O)_m$ or $N—R_3$;

E_1 is CH_2, CH_2CH_2, $CH(C_1–C_4$ alkyl), $C(CH_3)_2$ or CH aryl;

R_1 is hydrogen, halogen, $C_1–C_4$ alkyl, $C_1–C_4$ haloalkyl, $C_1–C_4$ alkoxy, $C_1–C_4$ halo-alkoxy, $C_1–C_4$ alkoxycarbonyl, $C_1–C_4$ alkylthio, $C_1–C_4$ alkylsulfinyl, $C_1–C_4$ alkylsulfonyl, sulfamoyl, $C_1–C_4$ alkylsulfamoyl, di($C_1–C_4$ alkyl)sulfamoyl, amino, $C_1–C_4$ alkylamino, or di($C_1–C_4$ alkyl)amino;

R, R_2 and R_3 are independently hydrogen, $C_1–C_4$ alkyl, $C_2–C_4$ alkenyl or $C_2–C_4$ alkynyl; m=0, 1 or 2;

X is CH_3, OCH_3, OCH_2CH_3, Cl, F, Br, I, OCF_2H, CH_2F or CF_3, Y is H, CH_3, OCH_3, OC_2H_5, CH_2OCH_3, NH_2, $NHCH_3$, $N(CH_3)_2$, C_2H_5, CF_3, SCH_3, $N(OCH_3)CH_3$, $OCH_2CH{-}CH_2$, $OCH_2C{-}CH$, OCH_2CF_3, cyclopropyl, Q $OCH_2CH_2OCH_3$, CH_2SCH_3, $(C{=}O)R_4$, $CR_4(QCH_3)_2$,



OCF_2H, SCF_2H, C≡CH or C≡CCH_3 where Q is O or S and R_4 is H or CH_3; and

Z is CH, CCH_3, CC_2H_5, CCl or CBr.

6. A herbicidal composition comprising an effective amount of a compound according to claim 1 and a carrier therefor.

4,929,270

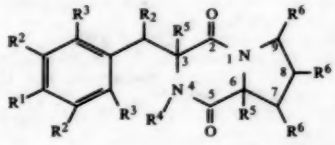
METHOD OF INDUCING CHLOROSIS IN A KNAPWEED PLANT

John H. Cardellina, II, Bozeman; Andrea C. Stierle, Butte, and Gary A. Strobel, Bozeman, all of Mont., assignors to Research and Development Institute, Inc. at Montana State University, Bozeman, Mont.

Filed Apr. 4, 1988, Ser. No. 177,536
Int. Cl.[5] A01N *43/90;* C07D *487/04, 487/14, 513/18*
U.S. Cl. 71—92 **8 Claims**

1. A method of selectively inducing chlorosis on a knapweed plant, comprising

applying a knapweed phytotoxic amount of the 3,6- L,L isomer of a cyclodipeptide of the formula

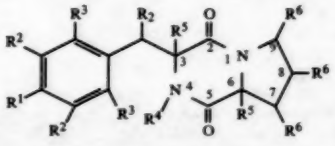


wherein R^1 is H and R^2 to R^6 are H, to the plant; and

allowing for the cyclodipeptide to remain in contact with the plant for a period of time effective to attain said effect.

5. A method of selectively inducing chlorosis on a knapweed plant, comprising

applying a knapweed phytotoxic amount of the 3,6 L,L isomer of a cyclodipeptide of the formula



wherein R^1 is OH and R^2 to R^6 are H to the plant; and

allowing for the cyclodipeptide to remain in contact with the plant for a period of time effective to attain said effect.

4,929,271

HERBICIDAL METHOD USING DIFLUFENICAN

Richard H. Hewett, Thaxted, and Brian M. Luscombe, Chelmsford, both of England, assignors to May & Baker Limited, Dagenham, England

Filed Dec. 23, 1987, Ser. No. 137,370

Claims priority, application United Kingdom, Dec. 23, 1986, 8630806

Int. Cl.[5] A01N *43/40, 37/38*

U.S. Cl. 71—94 18 Claims

1. A method of controlling the growth of weeds at a cereal crop locus which comprises applying to the locus, post-emergence of the weeds, an effective amount of (a) a phenoxyalkanoic acid herbicide selected from the group consisting of MCPA and CMPP or an agriculturally acceptable salt or ester thereof at an application rate of from 125 g to 250 g a.e. per hectare, and (b) diflufenican, which is N-(2,4-difluorophenyl)-2-(3-trifluromethyl-phenoxy)-nicotinamide at an application rate of from 25 g to 250 g per hectare.

4,929,272

N-PHENYL-MALEIMIDES AND N-PHENYL-SUCCINIMIDES AND THEIR USE IN A HERBICIDAL AND/OR PLANT GROWTH REGULATING ACTION

Hans Moser, Magden, Switzerland; Georg Pissiotas, Lörrach, Fed. Rep. of Germany; Hans-Georg Brunner, Lausen, Switzerland; Beat Böhner, Binningen, Switzerland, and Marcus Baumann, Basel, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

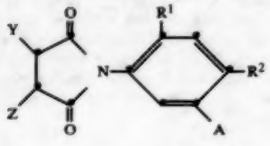
Continuation of Ser. No. 92,793, Sep. 3, 1987, Pat. No. 4,804,400. This application Dec. 8, 1988, Ser. No. 281,562

Claims priority, application Switzerland, Sep. 12, 1986, 3664/86; Apr. 28, 1987, 1616/87

Int. Cl.[5] C07D *207/448, 207/452;* A01N *37/24*

U.S. Cl. 71—95 10 Claims

1. N-phenylsuccinic acid-imides of the formula



wherein

R^1 is hydrogen or fluorine,

R^2 is halogen,

Y is C_1–C_8-alkyl,

Z is hydrogen or C_1–C_8-alkyl,

A is hydrogen or a group —XR^3,

X is oxygen or sulfur and

R^3 is C_1–C_8-alkyl, C_2–C_8-alkoxyalkyl, C_2–C_8-alkylthioalkyl, C_2–C_8-alkylaminoalkyl, C_2–C_8-haloalkyl, C_2–C_8-cyanoalkyl, C_3–C_8-alkenyl, C_3–C_8-haloalkenyl or C_3–C_8-alkynyl.

4,929,273

N-BENZYL-2-(4-FLUORO-3-TRIFLUOROMETHYL-PHENOXY)BUTANOIC AMIDE AND HERBICIDAL COMPOSITION CONTAINING THE SAME

Tetsuo Takematsu; Yasutomo Yakeuchi, both of Utsunomiya; Mitsuaki Takenaka, Ube; Seiji Takamura, Ube, and Akio Matsushita, Ube, all of Japan, assignors to Ube Industries, Ltd., Ube, Japan

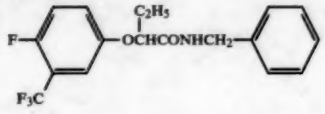
Continuation of Ser. No. 29,432, Mar. 23, 1987. This application Sep. 22, 1989, Ser. No. 412,635

Claims priority, application Japan, Mar. 28, 1986, 61-68805

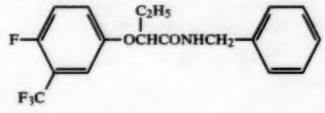
Int. Cl.[5] A01N *37/18;* C07C *103/178*

U.S. Cl. 71—118 6 Claims

1. N-benzyl-2-(4-fluoro-3-trifluoromethylphenoxy)butanoic amide represented by the formula:



3. A herbicidal composition comprising an herbicidally effective amount of N-benzyl-2-(4-fluoro-3-trifluoromethyl-phenoxy)butanoic amide represented by the formula:



in an agricultural carrier.

4,929,274

RECOVERY OF METAL VALUES FROM ORES

Lionel B. Luttinger, Erwinna, Pa., assignor to Drew Chemical Corporation, Boonton, N.J.

Filed Jun. 7, 1989, Ser. No. 362,896

Int. Cl.[5] C22B *11/04*

U.S. Cl. 423—25 4 Claims

1. In a process for recovering gold and silver values in which an aqueous alkali cyanide leach solution of about pH 10–11 is percolated through a heap of particulated gold/silver-bearing ore to form a pregnant leach solution containing extracted gold and silver as metal cyanide complexes; separating said extracted metal cyanide complexes from said pregnant leach solution by absorption on a column of activated carbon; and subjecting said activated carbon column to a stripping circuit in which the metal cyanide complexes are desorbed, the improvement which comprises extracting said gold and silver values using an aqueous alkali cyanide leach solution containing at least about 1 ppm of a surfactant which is hydrolyzable at the alkalinity of said leach solution and which does not interfer with the effectiveness of the subsequent carbon absorption of the metal cyanide complexes from said pregnant leach solution.

4,929,275

MAGNETIC ALLOY COMPOSITIONS AND PERMANENT MAGNETS

Yakov Bogatin, Philadelphia, Pa., assignor to SPS Technologies, Inc., Newtown, Pa.

Filed May 30, 1989, Ser. No. 357,845

Int. Cl.[5] B22F *1/00*

U.S. Cl. 75—246 39 Claims

1. A permanent magnet alloy composition comprising from about 0.5 to about 27 atomic percent R wherein R is at least one rare earth element including Y and Sc, from about 0.1 to

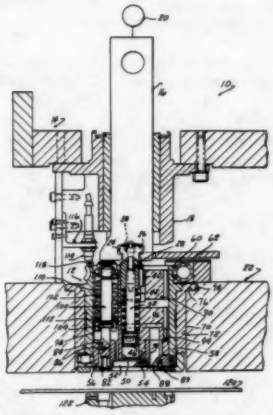
about 53 atomic percent A wherein A is at least one actinide element, and the balance being at least one metal wherein at least about 50 weight percent of the balance is at least one metal selected from the group consisting of Fe, Co, Ni, and Mn.

4,929,276

MULTITOOL PUNCH HOLDER

Victor L. Chun, Holland; James R. Hunter, Chadds Ford, and George Jaworski, Bala Cynwyd, all of Pa., assignors to Murata Wiedemann, Inc., King of Prussia, Pa.

Filed May 22, 1989, Ser. No. 355,237
Int. Cl.[5] B26F *1/08*
U.S. Cl. 83—552 **12 Claims**



1. In combination with a multitool punch holder (12) for engagement with a reciprocating ram (16) of a punch press apparatus (10), said multitool punch holder (12) including a rotary tool carrier (56) holding a circumferential array of punches (80) and enabling selective ram driving of any one of said plurality of punches (80) by rotation of said tool carrier (56) about an axis by an indexing drive therefor, characterized by a body member (30) interposed between said tool carrier (56) and said ram (16); a coupling means (26) connecting said ram (16) to said body member (30) to prevent rotation but allow relative axial movement therebetween; a striker rod (100) extending parallel to said punches (80) and slidably mounted in said body member at a location offset from the axis of rotation of said carrier so as to be aligned with each punch (80) successively as said tool carrier (56) is rotated; a stripper spring (110) urging said striker rod (100) to an elevated position in said body member (30) above said punches (80); said striker rod (100) having an upper end extending above said body member (30) and a lower end adapted to engage a punch; an engagement feature (108) on said ram (16) located to engage said striker rod (100) upper end after a predetermined relative axial movement between said ram (16) and said body member (30) from a separated position; separator spring means (42) urging said ram (16) and said body member (30) apart to said separated position; whereby upon continued downward movement of said ram (16), driving engagement of said body member (30) with a workpiece (120) arrests further downward movement of said body member (30), said separator spring means (42) thereafter overcome to cause said ram engagement feature (108) to engage and advance said striker rod (100), by continued downward movement of said ram (16) against the resistance of said stripper spring (110) enabling said striker rod (100) to contact and drive a punch (80) disposed beneath said striker rod (100) to cause punching of said workpiece (W) by said punch (80).

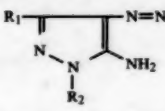
4,929,277

RECORDING LIQUID

Mitsugu Tanaka, and Takeo Sakai, both of Tokyo, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jul. 11, 1988, Ser. No. 217,205
Claims priority, application Japan, Jul. 10, 1987, 62-172433
Int. Cl.[5] C09D *11/02*
U.S. Cl. 106—22 **13 Claims**

1. A recording liquid comprising an organic solvent and at least one compound represented by formula (I):



(I)

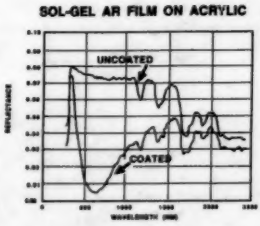
wherein R_1 represents a hydrogen atom, an alkyl group, an alkoxy group, an aryl group, a carboxylic acid ester group or a carbamoyl group; R_2 represents a hydrogen atom, an alkyl group or an aryl group; and R_3 represents an aryl group; provided that none of R_1, R_2 and R_3 is substituted with a sulfonic acid group wherein said liquid has a specific resistance of from about 10^5 to 10^{11} Ωcm.

4,929,278

SOL-GEL ANTIREFLECTIVE COATING ON PLASTICS

Carol S. Ashley, and Scott T. Reed, both of Albuquerque, N. Mex., assignors to United States Department of Energy, Washington, D.C.

Filed Jan. 26, 1988, Ser. No. 148,458
Int. Cl.[5] C09K *3/00*; C03C *3/00*
U.S. Cl. 106—287.12 **6 Claims**



1. A method for preparing a sol-gel antireflective surface coating solution comprising:
(a) subjecting a solution of a silicon alkoxide, a metal alkoxide, or a mixture thereof to hydrolyzation and condensation in a reaction system containing water and a catalyst in an alcohol solution;
(b) aging said system to form a sol-gel hydrolyzation-condensation polymeric reaction product;
(c) reliquifying the gel of said sol-gel reaction product by breaking the polymer-polymer bonds of said gel; and
(d) diluting said reliquified sol-gel reaction product to produce said surface coating solution.

4,929,279

PROCESS FOR DISPERSING ORGANIC PIGMENTS WITH ULTRASONIC RADIATION

Byron G. Hays, Verona, N.J., assignor to BASF Corporation, Parsippany, N.J.

Filed Feb. 21, 1989, Ser. No. 312,870
Int. Cl.[5] C09B *67/50*; C09D *3/387*
U.S. Cl. 106—412 **26 Claims**

1. A method of dispersing an organic pigment, the method comprising the steps of:

(A) adding a surfactant to an aqueous slurry of an organic pigment, the surfactant being selected from the group consisting of

1. the acidic salt of N-alkyl-N,N',N'trimethyl-1,3-propanediamine,
2. the acidic salt of N-alkyl-N,N',N'tris(2-hydroxypropyl)-1,3-propanediamine,
3. N-alkyl-N,N,N',N',N'-pentamethyl-1,3,-propanediamine dichloride,
4. the acidic salt of N-(N-alkyl-3-aminopropane)-N'(3 aminopropane)-1,3propanediamine,

wherein the alkyl group contains from about 12 to about 22 carbon atoms, and

5. a poly(ethyleneoxide) ether of an 18 carbon alcohol having 9 units of ethylene oxide thereon;

(B) dispersing the pigment by subjecting the slurry to ultrasonic radiation.

4,929,280

HYDROFORMYLATION OF CARBON BLACK

Lawson G. Wideman, Tallmadge, and Thomas J. Botzman, Stow, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Sep. 14, 1988, Ser. No. 244,233

Int. Cl.[5] C09C *1/44*

U.S. Cl. 106—472 **16 Claims**

1. A carbon containing compound comprising hydroformylated carbon black cold forming of metal objects by pressure.

4,929,281

METHOD FOR PRODUCING THIN-FILM SOLAR CELLS IN A SERIES-CONNECTED ARRAY

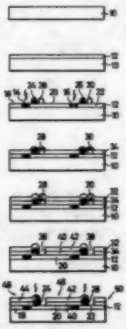
Jörg Wörner, Grosskrotzenburg, Fed. Rep. of Germany, assignor to NUKEM GmbH, Hanau, Fed. Rep. of Germany

Filed Mar. 31, 1988, Ser. No. 176,268

Claims priority, application Fed. Rep. of Germany, Apr. 14, 1987, 3712589

Int. Cl.[5] H01L *35/34*

U.S. Cl. 136—201 **24 Claims**



1. A method for producing thin-film solar cells connected in series, said method comprising the steps of:

depositing a first electrode layer on a substrate having a large area,

structuring said first electrode layer,

after said structuring of said first electrode layer, depositing at least one layer of semiconductive material over said first electrode layer,

depositing a second electrode layer over said at least one layer of semiconductive material, and

structuring said at least one layer of semiconductive material and said second electrode layer for producing said thin-film solar cells and connecting said solar cells in a side-by-side arrangement in series.

4,929,282

SILVER, THALLIUM, COPPER AND TELLURIUM-BASED THERMOELECTRICAL SEMICONDUCTIVE THERMOELECTRIC MATERIAL, PREPARATION AND APPLICATION TO THERMOELECTRIC CONVERTERS

Gérard Brun, Saint-Gely du Fesc; Rose-Marie Marin-Ayral, Montpellier; Maurice Maurin, Montpellier; Bernard Pistoulet, Montpellier, and Jean-Claude Tedenac, Frontignan, all of France, assignors to Centre National de la Recherche Scientifique, Paris, France

PCT No. PCT/FR87/00041, § 371 Date Apr. 19, 1988, § 102(e) Date Apr. 19, 1988, PCT Pub. No. WO87/05154, PCT Pub. Date Aug. 27, 1987

PCT Filed Feb. 17, 1987, Ser. No. 124,783

Claims priority, application France, Feb. 19, 1986, 86 02226

Int. Cl.[5] H01L *35/20*

U.S. Cl. 136—239 **4 Claims**

1. Silver, thallium, copper and tellurium-based thermoelectric semiconductor materials, characterized in that they are represented by the general formula (I)

$$Ag_xCu_yTlTe_{1+z} \qquad (I)$$

wherein, x, y and z are:

$0.55<x<0.75$; $0.25<y<0.40$ and $0<z<0.10$.

4,929,283

VAPOR PHASE ARTIFICIAL AGING OF METAL ALLOYS USING FLUOROCHEMICALS

John C. W. King, Orefield; Donald J. Bowe, Allentown, and Paul T. Kilbefiner, III, Wescosville, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Continuation-in-part of Ser. No. 320,199, Mar. 7, 1989, abandoned. This application Sep. 7, 1989, Ser. No. 404,160

Int. Cl.[5] C22F *1/02*

U.S. Cl. 148—13.2 **20 Claims**

1. In a process for the artificial aging at elevated temperatures of metal alloys to impart precipitation hardening, the improvement comprising aging said alloy in the elevated temperature vapor of a fluorochemical compound.

4,929,284

WATER REMOVABLE SOLDER STOP

James A. Clanton, Wenonah, N.J., assignor to General Electric Company, Camden, N.J.

Filed Dec. 16, 1988, Ser. No. 285,697

Int. Cl.[5] B23K *35/34*

U.S. Cl. 148—23 **16 Claims**

1. A solder stop composition capable of being cured to a dried state on a substrate and removable from the substrate by water, comprising:

(a) a water soluble binder dissolved in water;

(b) a viscosity control agent in an amount sufficient to increase the consistency of the composition to a semisolid paste;

(c) a thermal insulator filler in an amount which prevents heat from passing through the composition in a dried, solid state on a substrate; and

(d) a water soluble moisturizer extender control agent in an amount sufficient to prevent cracking and tackiness of the solder stop composition in the dried, solid state on a substrate.

4,929,285

ALUMINUM SHEET PRODUCT HAVING REDUCED EARING AND METHOD OF MAKING

Mohammad A. Zaidi, Monroeville, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed May 4, 1989, Ser. No. 347,183
Int. Cl.[5] C22F *1/04*
U.S. Cl. 148—11.5 A 16 Claims

1. A method of fabricating sheet stock having reduced earing during container forming, the method comprising the steps of:

(a) providing a body of an aluminum base alloy suitable for rolling into sheet stock for forming containers therefrom;

(b) hot rolling said body to provide a flat rolled product having a partially recrystallized but predominantly hot rolled structure with 5 to 20% of said structure being recrystallized;

(c) annealing said flat rolled product at a controlled heat-up rate of 0.5° to 50° F./hr. in a temperature range of 400° to 700° F. to provide said product in a fully recrystallized condition; and

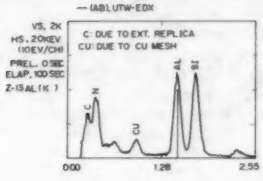
(d) cold rolling said annealed product to sheet stock which has reduced earing during container forming.

4,929,286

METHOD FOR PRODUCING A GRAIN-ORIENTED ELECTRICAL STEEL SHEET

Hajime Komatsu; Mitsuru Tanino, both of Kawasaki; Yozo Suga, and Toyohiko Konno, both of Kitakyushu, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Division of Ser. No. 883,962, Jul. 10, 1986, abandoned. This application Oct. 7, 1988, Ser. No. 267,729
Claims priority, application Japan, Aug. 15, 1985, 60-179855
Int. Cl.[5] H01F *1/04*
U.S. Cl. 148—111 10 Claims



1. In a method for producing a grain-oriented electrical steel sheet having a high magnetic flux density, said method including the steps of:

providing a silicon steel slab containing from 1.5 to 4.5% Si as well as Al and N;

hot rolling said slab to provide a hot rolled strip;

annealing said hot rolled strip;

cold rolling said hot rolled strip once or twice to produce a cold roll strip having a final sheet thickness;

decarburization annealing said strip after cold rolling;

applying an annealing separator to said strip after said decarburization annealing; and thereafter,

finish annealing said strip to carry out secondary recrystallization and purification;

the improvement comprising:

heating said slab prior to hot rolling to a temperature at which incomplete solution of Al and N occurs;

nitriding said strip after said decarburization annealing and prior to initiation of secondary recrystallization in said finishing annealing step thereby forming precipitates of (Si, Al)N, said precipitates causing said secondary recrystallization.

4,929,287

METHOD FOR SURFACE TREATMENT OF METAL ALLOYS

Modjtaba Hirbod, Finspong, Sweden, assignor to ABB Stal AB, Sweden

Filed Sep. 22, 1988, Ser. No. 247,640
Claims priority, application Sweden, Jun. 13, 1988, 8802186
Int. Cl.[5] C23F *17/00*; C23C *8/10*
U.S. Cl. 148—276 11 Claims

1. A method for improving the corrosion/erosion resistance of a high-temperature Fe, Co or Ni-based alloy having a surface that is exposed to combustion products of coal, coal products, waste or the like and which contains a metal selected from the group consisting of Cr and Al, said method comprising the steps of

(a) heating the surface of said alloy to a temperature between 500° and 1200° C. to selectively oxidize Cr and Al at said surface to form an oxide layer,

(b) applying a substance to said oxide layer to promote adhesion and ductility of said oxide layer, and

(c) subjecting said surface to an elevated temperature in an environment adapted to facilitate incorporation of said substance into said oxide layer, thereby providing an oxide layer having a thickness which does not exceed 20 μm.

4,929,288

CORROSION AND ABRASION RESISTANT ALLOY

Robert J. Borges, 14130 Parliament Dr., Chesterfield, Mo. 63017

Filed Jan. 4, 1988, Ser. No. 140,740
Int. Cl.[5] C22C *38/22*
U.S. Cl. 148—326 18 Claims

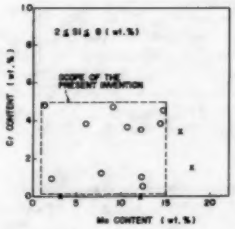
1. In a white iron alloy the improvement comprising a high chromium iron base having a ferritic matrix containing a dispersed phase, the alloy containing a dispersed phase, the alloy containing between about 26 to 28% chromium, between about 0.9 to 12% carbon, between about 0.4 to 0.75% silicon and between about 0.5 to 1.0% tungsten, and a portion of the tungsten being present in the dispersed phase, the alloy having substantial resistance to combined corrosion and abrasion in hot acid slurries.

4,929,289

IRON-BASED SHAPE-MEMORY ALLOY EXCELLENT IN SHAPE-MEMORY PROPERTY AND CORROSION RESISTANCE

Yutaka Moriya; Tetsuya Sanpei, and Hisatoshi Tagawa, all of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan

Filed Feb. 23, 1989, Ser. No. 314,564
Claims priority, application Japan, Apr. 5, 1988, 63-83495
Int. Cl.[5] C22C *38/34, 38/38*
U.S. Cl. 148—402 12 Claims



1. An iron-based shape-memory alloy excellent in a shape-memory property and a corrosion resistance, consisting essentially of:

chromium:	from 0.1 to 5.0 wt. %,
silicon:	from 2.0 to 8.0 wt. %,
manganese:	from 1.0 to 14.8 wt. %,
at least one element selected from the group consisting of:	
nickel:	from 0.1 to 20.0 wt. %,
cobalt:	from 0.1 to 30.0 wt. %,
copper:	from 0.1 to 3.0 wt. %,
and	
nitrogen:	from 0.001 to 0.400 wt. %,
where, Ni + 0.5 Mn + 0.4 Co + 0.06 Cu + 0.002 N ≧ 0.67 (Cr + 1.2 Si),	
and	
the balance being iron and incidental impurities.	

4,929,290

CRASH BAG PROPELLANT COMPOSITION AND METHOD FOR GENERATING NITROGEN GAS

Richard V. Cartwright, Sussex, N.J., assignor to Hercules Incorporated, Wilmington, Del.

Division of Ser. No. 223,965, Jul. 25, 1988. This application Nov. 17, 1989, Ser. No. 437,861

Int. Cl.[5] C06B *35/00*

U.S. Cl. 149—35 **16 Claims**

1. A propellant composition comprising, in combination,

(a) a metal azide salt component of a group 1(a)- or 2(a)-type metal; and

(b) an oxide of a non-toxic transition metal element sufficient to react with up to about 70% of said metal azide salt component; and

(c) an effective amount of a modifier component represented by the formula

$$Me_x(An)_o$$

wherein

Me is defined as a cation of a non-toxic transition metal element;

An is defined as a member selected from the group consisting of a carbon-containing, a silicon-containing, and a boron-containing anion group chemically compatible with Me and capable of reacting with said metal azide salt component to obtain non-toxic by-products less basic than a metal hydroxide corresponding to said metal azide salt component; and

x and o are individually defined as positive numbers appropriate to indicate the corresponding chemical formula.

4,929,291

PROPELLANT CONTAINING 2-HYDROXYMETHYL-1,3-PROPANEDIOL TRINITRATE

Michael W. Barnes, Brigham City, Utah, assignor to Thiokol Corporation, Ogden, Utah

Continuation of Ser. No. 757,191, Jul. 22, 1985, abandoned, which is a continuation of Ser. No. 592,732, Mar. 22, 1984, abandoned, which is a continuation of Ser. No. 332,030, Dec. 15, 1981, abandoned, which is a continuation of Ser. No. 66,195, Aug. 13, 1979, abandoned, which is a continuation of Ser. No. 854,946, Nov. 25, 1977, abandoned. This application Mar. 30, 1989, Ser. No. 333,728

Int. Cl.[5] C06B *45/10*

U.S. Cl. 149—19.4 **1 Claim**

1. A propellant composition consisting of:

A. about 19.989% by weight trimethylolmethane trinitrate;

B. about 4.872% by weight hydroxy-terminated polycaprolactone;

C. about 0.839% by weight of a polyfunctional isocyanate based on hexamethylene diisocyanate;

D. about 0.25% by weight 4-nitrodiphenylamine;

E. about 1.0% by weight carbon black;

F. about 0.05% by weight triphenylbismuth;

G. about 23.00% by weight cyclotetramethylene tetranitramine;

H. about 20.00% by weight ammonium perchlorate; and

I. about 30.00% by weight ammonium nitrate.

4,929,292

METHOD FOR THE MANUFACTURE OF A PNEUMATIC TIRE

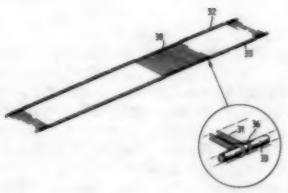
Eric Holroyd, High Legh Park, and Anthony R. Wright, Southport, both of England, assignors to Apsley Metals Limited, England

Continuation of Ser. No. 891,113, Jul. 31, 1986, abandoned. This application Jun. 30, 1988, Ser. No. 214,842

Claims priority, application United Kingdom, Aug. 3, 1985, 85 19579

Int. Cl.[5] B29D *30/32*

U.S. Cl. 156—132 **7 Claims**



1. A method of manufacture of a pneumatic tire including the steps of:

(a) winding a single continuous reinforcing cord around a pair of spaced apart spindles to form a cord ply comprising a series of adjacent windings of said single cored with a series of cord loops adjacent each edge of the cord ply;

(b) rubberizing the cord ply as it emerges from the spindles to form a cord reinforced elastomeric ply with said series of cord loops adjacent each edge thereof being unrubbered;

(c) locating at least one support element in each said series of loops either prior to or after the rubberizing step;

(d) convoulte winding the elastomeric ply with said at least one support element in situ into a cylindrical form with said support elements being formed into rings by circling said support elements and winding the elastomeric ply around a former of a diameter greater than the diameter of bead wire assemblies to be incorporated in the tire, the ends of said support elements then being joined and the circled support elements crimped to reduce their diameters and turn down the edge portions of the ply;

(e) locating bead wire assemblies coaxially of the cylindrical elastomeric ply and in situ support elements by passing each bead wire assembly over the respective reduced-diameter support element and pressing said bead wire assembly against the respective turned down edge portion of the ply, the support elements being subsequently released to expand radially and resume their natural circular configuration; and

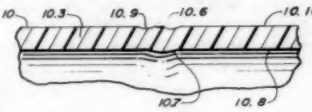
(f) incorporating the support elements into each bead assembly by pressing said elements into engagement with the respective bead wire assemblies to anchor the loops of cord to each respective bead assembly.

4,929,293

WELDING FLUOROPOLYMER PIPE AND FITTINGS

Michael L. Osgar, Eagan, Minn., assignor to Fluoroware, Inc., Chaska, Minn.

Continuation of Ser. No. 628,784, Jul. 9, 1984, abandoned. This application Jul. 3, 1986, Ser. No. 881,969
Int. Cl.[5] B29C 27/06
U.S. Cl. 156—158 10 Claims



1. The method of joining together the ends of tubular flow ducts of melt processible fluoropolymers which material has a high degree of chemical inertness and continuous service temperatures in the general range of 300° to 500° F., consisting in the steps of

shaping the end faces of the ducts to lie flat and normal to the duct axis,

placing a flat faced infrared heater in confronting relation with the duct ends and spaced therefrom by a distance in the range of up to two inches, maintaining the heater face at temperatures in the range of 1250° to 2000° F. and at the duct ends for a period up to sixty seconds until the fluoropolymer material in the duct becomes visibly molten to depths of up to one-eigth inch from the end faces of the ducts,

removing the heater from the duct ends, and

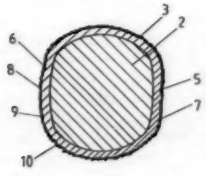
immediately moving one of the duct ends into engagement with the other duct end, and with only a minimum of pressure pressing and holding the duct ends together for a period up to forty-five seconds until the molten duct material solidifies again.

4,929,294

METHOD OF CREATING PROFILING PROJECTIONS ON PLASTIC-COVERED STEEL PARTS

Peter Blome, Herne, Fed. Rep. of Germany, assignor to Blome GmbH & Co. Kommanditgesellschaft, and Strabag Bau-Aktiengesellschaft, Fed. Rep. of Germany

Filed Aug. 14, 1987, Ser. No. 86,101
Claims priority, application Fed. Rep. of Germany, Aug. 23, 1986, 3628704; Apr. 4, 1987, 3711420
Int. Cl.[5] B05D 1/06, 3/02, 5/00; B32B 3/00
U.S. Cl. 156—187 25 Claims



1. A method of covering a steel part wherein, on an outer surface of the part, there has been applied a plastic coating which can be brought into or is in contact, at least in individual regions, with an embedding material, comprising the steps of:

under the action of heat, applying a plastic material consisting solely of a granular thermosetting plastic powder or granulate to the plastic coating to form an interface to the embedding material by an outer surface of the plastic coating with profiling projections, the plastic coating being a thermosetting plastic in a tacky partially hardened state during said applying step, the plastic coating allowing individual particles of the powder or granulate to protrude from the plastic coating to form the profiling projection, said projections consisting solely of said particles of powder or granulate; and

hardening the plastic coating and the plastic material thereon to a fully hardened state.

4,929,295

METHOD OF MANUFACTURING CERAMIC LAMINATE

Yoshiaki Kohno, and Norio Sakai, both of Kyoto, Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Jan. 6, 1989, Ser. No. 295,047
Claims priority, application Japan, Jan. 7, 1988, 63-1702
Int. Cl.[5] B32B 18/00, 31/04
U.S. Cl. 156—230 16 Claims

1. A method of manufacturing a ceramic laminate, said method comprising the steps of:

preparing first and second ceramic green sheets containing a first ceramic powder and a first binder;

forming a metal paste film containing a metal powder and a second binder on one major surface of said second ceramic green sheets;

preparing a junction member containing a solvent capable of dissolving both said first binder and said second binder; and

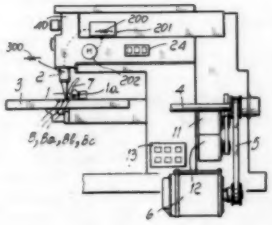
stacking said first and second ceramic green sheets and said junction member together in such a manner that said metal paste film and said junction member are located between opposing surfaces of said first and second ceramic green sheets.

4,929,296

MACHINE FOR GLUEING AND FOLDING SHEET-LIKE MATERIALS

Luciano Zorzolo, Vigevano, Italy, assignor to Comelz S.p.A., Vigevano, Italy

Filed May 2, 1989, Ser. No. 346,198
Claims priority, application Italy, May 3, 1988, 20434 A/88
Int. Cl.[5] B05C 5/00
U.S. Cl. 156—357 5 Claims



1. A machine for folding and glueing edges of sheetlike workpieces, such as leather parts of shoe uppers, comprising a worktable, a foot for folding an edge of a workpiece, a cutting blade for cutting inwardly curved portions, means for advancing the workpiece, a glue dosage and delivery device, a main motor, photo-reponsive means for detecting presence and

shape of the workpiece, and kinematic elements arranged between said main motor and said foot, blade and advancing means, comprising at least one electronic control unit, for memorizing groups of machine setting parameters related to a plurality of workpieces of various types and dimensions, so as to automatically select settings suitable for the instant Workpiece, and a plurality of drivers for transmitting said settings to said kinematc elements, the memorization comprising at least the following setting parameters:

preset dosage of glue quantity, glue temperature and temperature of the glue delivery device;

delay time for starting glue dispensing;

advancement pitch of the machine during treatment of outwardly curved regions of the workpiece;

maximum rotation rate of the machine during treatment of the outwardly curved regions of the workpiece;

advancement pitch during the treatment of straight portions of the workpiece;

machine maximum rotation rate during treatment of the straight portions of the workpiece;

advancement pitch during the treatment of the inwardly curved regions of the workpiece;

maximum rotation rate of the machine during treatment of inwardly curved portions of the workpiece;

possible actuation of the cutting blade;

manual and automatic actuation of the glue delivery device;

selection of the light-reponsive means intended to detect the shape of the workpiece and to cause change in the pitch and rotation rate;

selection of the light-reponsive means causing actuation of the cutting blade;

operation mode of the machine selected between manual mode or automatical mode with startup when workpiece is inserted at set speed, or continuous mode at set speed: displays for displaying the selected parameters for each workpiece and means for setting desired parameter values being furthermore provided.

4,929,297

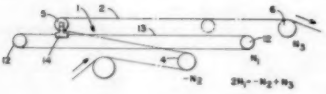
SPLICING SYSTEM

Hiroshi Sato, Hiroshima, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 25, 1989, Ser. No. 301,101

Int. Cl.[5] B65H *19/14*

U.S. Cl. 156—361 **2 Claims**



1. A splicing system for paying out a rolled sheet and continuously feeding a sheet to a downstream machine, which includes a sheet splicer for stopping a running sheet and splicing a tip end of another new sheet therewith, a tension roll in a dancer roll section for forming a sheet pool downstream of said sheet splicer, which tension roll is provided for the purpose of feeding the running sheet without changing the speed of said downstream machine, an accelerating roll for stopping a running old sheet and accelerating the new sheet upstream of said dancer roll section and downstream of said sheet splicer, and a guide roll provided downstream of said dancer roll section and upstream of said downstream machine for feeding the sheet coming from said dancer roll section to the downstream machine; characterized in that when a rotational speed of said accelerating roll is represented by $-N_2$, a rotational speed of said guide roll is represented by $+N_3$, and a rotational speed of a drive shaft for moving the tension roll in said dancer roll section is represented by N_1, said drive shaft is driven so as to fulfil the relation of

$$N_1 = \frac{(-N_2) + N_3}{2},$$

and thereby variation of the tension in the sheet applied to said tension roll accompanying the variation of the rotational speed of said accelerating roll can be made zero, wherein the rotational speed of the accelerating roll is set to be somewhat faster than the rotational speed of the guide roll, and thereby the tension roll in the dancer roll section can be moved in the direction for increasing the pooled amount of the sheet, according to the rotational speed of

$$N_1 = \frac{(-N_2) + N_3}{2},$$

and wherein the drive shaft for moving the tension roll in said dancer roll section is coupled to said guide roll and said accelerating roll via planetary gears.

4,929,298

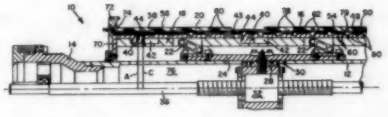
TIRE BUILDING DRUM INCLUDING AN EXPANDABLE SEGMENTAL CYLINDER ASSEMBLY AND A VACUUM CHAMBER

Robert J. Van Der Poel, Cruchten, and Armand Wantz, Bissen, both of Luxembourg, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed May 13, 1988, Ser. No. 193,808

Int. Cl.[5] B29D *30/24*

U.S. Cl. 156—414 **10 Claims**



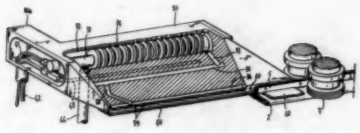
1. A tire building drum comprising a drum support shaft, an expandable segmental cylinder assembly mounted on said support shaft, said cylinder assembly having a plurality of axially extending, circumferentially spaced-apart segments, each of said segments being expandable from a first radius in a contracted condition of said drum to a second radius in an expanded condition of said drum, an elastic cover sleeve comprising an outboard sleeve section, a center sleeve section and an inboard sleeve section in abutting, sealing relation, sealing means at each end of said cover sleeve defining a vacuum chamber within said cover sleeve, said center sleeve section having vacuum openings at predetermined positions on a radially outer surface of said center sleeve for holding tire components on said radially outer surface, a source of vacuum in communication with said vacuum chamber within said cover sleeve, and said sealing means at said inboard end comprising a shoulder of an inboard edge of said inboard sleeve section engageable with a lip of an end flange mounted on said support shaft when the segmental cylinder assembly is expanded to said second radius.

4,929,299

SEALING DEVICE WITH MULTIPLE DIFFERENTIAL ACTION FOR MACHINES PRODUCING DUAL-USE FILTER SACHETS FOR INFUSION PRODUCTS

Andrea Romagnoli, San Lazzaro di Savena, Italy, assignor to Cestind - Centro Studi Industriali-S.R.L., San Pietro Terme, Italy

Continuation of Ser. No. 154,784, Feb. 10, 1988, abandoned. This application Jun. 13, 1989, Ser. No. 366,303
Claims priority, application Japan, Mar. 9, 1987, 62-3378
Int. Cl.[5] B65B 51/20
U.S. Cl. 156—466 4 Claims



1. A sealing device for sealing a longitudinal crest of a strip of thermally weldable paper having longitudinal edges turned inwardly and vertically into contact with one another to form said strip into a tube, preferably for receiving portions of an infusion product in the production of infusion-beverage bags, said sealing device comprising:

means for advancing said tube along a path, said tube being formed with a flattened tubular bottom portion bridging two horizontal sides of said strip, each of said horizontal sides running into a respective vertical side of the strip, said vertical sides of the strip being formed with said longitudinal edges of said strip turned inwardly and vertically;

horizontal supporting means below said path for quiding said bottom portion of said tube; and

a pair of blocks extending along said path for welding said longitudinal edges forming said crest together, said blocks having:

mutually juxtaposed mirror-symmetrical stepped edges flanking said crest and extending along said path, each of said stepped edges having a laminar step extending closest to the other stepped edge and slidingly guiding respective sides of said crest, each of said laminar steps being formed with a horizontal bottom of the laminar step above said horizontal supporting means and a vertical side of said laminar step flanking the respective vertical side of said strip, said horizontal bottom of said laminar step being engaged with the respective horizontal side of said strip forming said crest having the respective longitudinal edge of said strip above said laminar step, and a setback step confronting the respective vertical side of said strip and formed with a plurality of bores opening toward the respective vertical side of said strip;

a heat source in each block, and

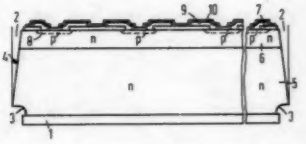
passage means in each block communicating with said heat source, connected to a source of fluid, and connected with said bores for training streams of said fluid after heating by said source upon said vertical sides of said strip to weld said longitudinal edges at said crest, said blocks being of trapezoidal configuration and having sides tapering toward said crest and the other block and formed with said stepped edges, said blocks each being formed with an elongated chamber parallel to the respective edge, each heat source being a resistance heater received in the respective chamber, said passage means including means connecting an air source to one end of said chamber and a passage connecting an opposite end of each chamber with the respective bores of the respective body, said resistance heater having a generally helical winding, said bores of each body opening into a respective conduit extending along the respective stepped edge and the respective passage connects said opposite end of the chamber with the horizontal conduit of the respective body.

4,929,300

PROCESS FOR THE SEPARATION OF MONOLITHIC LED CHIP ARRANGEMENTS GENERATED ON A SEMICONDUCTOR SUBSTRATE WAFER

Walter Wegleiter, Nittendorf, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Aug. 4, 1989, Ser. No. 389,451
Claims priority, application Fed. Rep. of Germany, Aug. 5, 1988, 3826736
Int. Cl.[5] H01L 21/306; B44C 1/22; C23F 1/02; C03C 15/00
U.S. Cl. 156—645 4 Claims



1. A process for the separation of high-resolution LED chip arrangements fabricated monolithically on a semiconductor substrate wafer and having on their back side a pervasive metallization layer and on their border regions separation tracks for arraying the LED chip arrangements in series with further LED chip arrangements, said process comprising the steps of:

patterning the metallization on the back side to form areas corresponding to the separation tracks,

etching in the formed areas to provide depressions into the back side of the semiconductor substrate wafer, and then separating the LED chip arrangements along said tracks.

4,929,301

ANISOTROPIC ETCHING METHOD AND ETCHANT

Nicholas Beechko, South Burlington, Vt., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 18, 1986, Ser. No. 875,833
Int. Cl.[5] C09K 13/00
U.S. Cl. 156—657 7 Claims

1. A method for etching silicon including the steps of preparing an etch solution comprising:

preparing an ethylene-diamine free etch solution comprising ethanol-amine, pyrocatechol, water, piperidine and hydrogen peroxide,

applying said etch solution to said silicon at temperatures for time sufficient to affect a desired etched pattern.

4,929,302

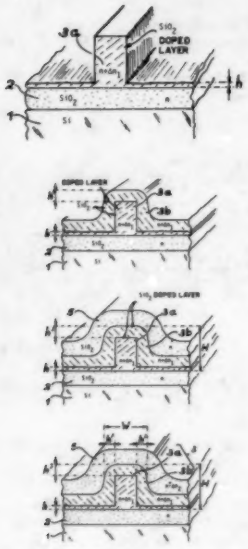
PROCESS FOR THE PRODUCTION OF LIGHT MICROGUIDES WITH LOW OPTICAL PROPAGATION LOSSES BY MULTICOATING DEPOSITION

Serge Valette, Grenoble, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Dec. 20, 1988, Ser. No. 287,076
Claims priority, application France, Dec. 24, 1987, 87 18155
Int. Cl.[5] H01L 21/306; B44C 1/22; C03C 15/00, 25/06
U.S. Cl. 156—657 6 Claims

1. A process for the production of light microguides with low optical propagation losses by multilayer deposition comprising, deposited in this order on a substrate (1), a first layer (2) of index n, a second guide layer (3) of index $n+\Delta n_1$ and a third layer (5) covering the two aforementioned layers of index $n+\Delta n_2$, with $\Delta n_2 < \Delta n_1$ or $n-\Delta n_2$, characterized in that the

second guide layer (3) is deposited in two successive stages involving a first deposition stage followed by a partial etching of a first intermediate layer (3*a*) through an appropriate mask, in order that the unmasked part of the first intermediate layer has a thickness, countered from the interface located between the first layer and the first intermediate layer equal to h and compatible with the accuracy of the etching so as not to reach



the interface between the first layer (2) and the second layer (3), a second stage of depositing a second intermediate layer (3*b*) of a material having the same index $n+\Delta n_1$ as the first preceding intermediate layer (3*a*) and surmounting the same by a height h' adequate not to reproduce the etching defects of said preceding intermediate layer (3*a*), the total thickness $h+h'$ of the etched part of the second layer having to be compatible with the operation of the microguide.

4,929,303

COMPOSITE BREATHABLE HOUSEWRAP FILMS

Paresh J. Sheth, Sugarland, Tex., assignor to Exxon Chemical Patents Inc., Linden, N.J.

Continuation-in-part of Ser. No. 24,503, Mar. 11, 1987. This application Sep. 25, 1987, Ser. No. 101,118

Int. Cl.[5] B31F *1/20*

U.S. Cl. 156—209 **17 Claims**

11. The method of claim **10**, wherein the lamination comprises heating the fabric and pressing the unheated film to the heated fabric.

4,929,304

METHOD FOR MANUFACTURING AUTOMOTIVE SEAT

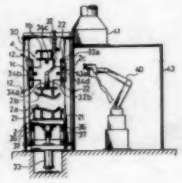
Muneharu Urai; Hiroyuki Makino, and Makoto Shimada, all of Akishima, Japan, assignors to Tachi-S Co., Ltd., Tokyo, Japan

Filed Jan. 23, 1989, Ser. No. 300,181

Claims priority, application Japan, May 31, 1988, 63-134071; May 31, 1988, 63-134072

Int. Cl.[5] B32B *31/20*

U.S. Cl. 156—245 **4 Claims**



1. A method for manufacturing an automotive seat, which uses an apparatus comprising a revolvable body, a plurality of upper molding dies, a plurality of padding securing members, such that said upper molding dies and padding securing members are provided on said revolvable body in a manner alternating with each other, and a plurality of lower molding dies disposed under said revolvable body, said lower molding dies being movable horizontally relative to said revolvable body and having a surface corresponding in shape to an outer contour of said seat, said method comprising the steps of:

placing a top cover member on one of said lower molding dies;

raising said one of said lower molding dies towards one of said upper molding die so as to press said top cover member against the latter, to thereby mold said top cover member into said outer contour of said seat, while at the same time, securing a seat padding on one of said padding securing members;

then, lowering said one of said lower molding dies, while at the same time, revolving said revolvable body to bring said seat padding to a mutually faced relation with said one of said lower molding dies; and

then, again, raising said one of said lower molding dies with said top cover member placed thereon towards said seat padding so as to bond said top cover member to said seat padding in an integral manner.

4,929,305

METHOD OF BONDING USING UV CURABLE EPOXY RESIN COMPOSITIONS WITH DELAYED CURE

Thomas P. Wacker, Schenectady, and Raymond J. Zabinski, Albany, both of N.Y., assignors to General Electric Company, Waterford, N.Y.

Division of Ser. No. 168,528, Mar. 7, 1988, Pat. No. 4,857,562, which is a continuation of Ser. No. 8,905, Jan. 30, 1987, abandoned. This application Apr. 20, 1989, Ser. No. 340,947

Int. Cl.[5] B32B *31/00*

U.S. Cl. 156—273.3 **10 Claims**

1. A method for employing an epoxy resin composition comprising the steps:

(a) exposing a composition to sufficient UV radiation to activate a UV catalyst, said composition comprising:

(i) an epoxy resin,

(ii) a sufficient amount of the UV catalyst to render the composition UV curable, and

(iii) a sufficient amount of an epoxy functional fixing agent comprising poly(alkylene oxide) moieties, the fixing agent capable of delaying the cure of the composition for a fixed period of time after exposure to UV radiation; and

(b) positioning the epoxy composition between two opaque surfaces for bonding; and
(c) curing the epoxy composition by heating to a temperature between about 40° C. and 150° C.

4,929,306
FIXTURE FOR MOUNTING SMALL PARTS FOR PROCESSING

Larry R. Foreman, 2456 36th St., Los Alamos, N. Mex. 87544; Veronica M. Gomez, Rte. 5 Box 283, Santa Fe, N. Mex. 87501, and Michael H. Thomas, Rte. 3-193-1, Espanola, N. Mex. 87532

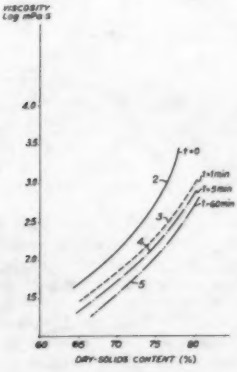
Filed Sep. 29, 1988, Ser. No. 250,672
Int. Cl.[5] B32B *31/00*
U.S. Cl. 156—306.3 **8 Claims**

5. A method of mounting small parts for processing, comprising the steps of:
forming a truncated conical glass stalk having a tip end and a base end;
forming on said tip end a quantity of cured adhesive having an extending streamer; and
touching said small parts to said streamer to adhere said parts to said streamer.

4,929,307
METHOD OF DECREASING BLACK LIQUOR VISCOSITY

Erkki J. Kiiskilä, Karhula, and Nils E. Virkola, Helsinki, both of Finland, assignors to A. Ahlstrom Corporation, Karhula, Finland

Continuation of Ser. No. 110,710, Jul. 29, 1987, abandoned. This application Feb. 17, 1989, Ser. No. 312,424
Claims priority, application Finland, Nov. 29, 1985, 85 4732
Int. Cl.[5] B01D *1/26*; D21C *11/10*
U.S. Cl. 159—47.3 **7 Claims**



1. A method for decreasing the viscosity and improving the evaporability of sulfate black liquor containing different macro-molecular lignin fractions and substantially no fibrous material from a cellulose cook being cooked in a digester at a cooking temperature, consisting essentially of:
withdrawing said sulfate black liquor from said digester;
raising the temperature by pressure heating said sulfate black liquor to a temperature above the cooking temperature prior to final evaporation thereof without separating said different fractions;
maintaining said black liquor at said raised temperature for 1–60 minutes so as to split the macro-molecular lignin fractions contained in said liquor; and thereafter
evaporating said black liquor.

4,929,308
PAPERMAKING PROCESS AND COMPOSITION FOR THE PRODUCTION OF TRIDIMENSIONAL PRODUCTS CONTAINING THERMOPLASTICS RESIN AND REINFORCING FIBERS

Patrice Gerault, Puteaux; Michel Goguelin, and Pierre Fredenucci, both of Charavines, all of France, assignors to Arjomari-Prioux, Paris, France

Filed Sep. 24, 1987, Ser. No. 101,076
Claims priority, application France, Sep. 25, 1986, 86 13408; Feb. 23, 1987, 87 02335
Int. Cl.[5] D21H *13/36*
U.S. Cl. 162—145 **13 Claims**

1. A process for producing a tridimensional piece from an aqueous suspension containing at least a thermoplastic resin and reinforcing fibers, comprising the following successive steps:
(a) preparing a suspension consisting essentially of the following composition (in % by weight):

Binding fibers	5–13
Reinforcing fibers	26–34
Thermoplastics resin	40–60
Fillers	0–40

(b) wet-molding the elements of the suspension into a preform having, in the three dimensions, the general outline of the final piece in a preforming station before de-watering;
(c) at least partly de-watering the preform;
(d) pre-heating said preform to a temperature higher than the melting point of the thermoplastics resin; and
(e) molding said preform under pressure into its final shape in a press heated to a temperature below the melting point of the thermoplastics resin, wherein said pressure is less than 100 bars.

4,929,309
NITROGEN-CONTAINING WATER-SOLUBLE POLYMERIC COMPOUNDS

Henning Bachem, Cologne; Carlhans Süling, Odenthal; Janos Muszik, Leverkusen, and Wolf-Dieter Schröer, Munich, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Mar. 15, 1989, Ser. No. 324,365
Claims priority, application Fed. Rep. of Germany, Mar. 26, 1988, 3810425
Int. Cl.[5] C08G *73/00*
U.S. Cl. 162—164.3 **10 Claims**

1. Water soluble crosslinkable polymeric compounds which are obtainable by reaction of reaction products, containing halogenohydrin groups, of ammonia or mono- or polyamines and an epihalogenohydrin with inorganic bases and subsequent reaction of the resulting compounds containing epoxide groups with halogen-free sulphonic acids to give compounds containing sulphonic acid ester groups.

4,929,310

APPARATUS FOR DEODORIZING ORGANIC LIQUIDS

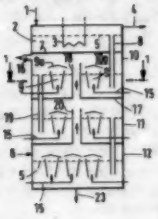
Helmut Saft, Friedberg, Fed. Rep. of Germany, assignor to Metallgesellschaft AG, Frankfurt am Main, Fed. Rep. of Germany

Filed Apr. 27, 1989, Ser. No. 344,650

Claims priority, application Fed. Rep. of Germany, Apr. 27, 1988, 3814254

Int. Cl.[5] B01D 3/10, 3/38

U.S. Cl. 202—158 4 Claims



1. An apparatus for deodorizing an organic liquid, comprising:

a treatment vessel;

means connected with said treatment vessel for applying a subatmospheric pressure thereto;

means in said treatment vessel defining at least one treatment level upon which a body of predetermined height of an organic liquid to be deodorized is maintained, said organic liquid being at a temperature of substantially 130° to 260° C.;

a plurality of upwardly upon frustoconical circulating ducts spaced apart at said level and diverging upwardly with a cone angle A, measured against the vertical, of substantially 5° to 20° from an open lower portion having a small cross section and receiving said liquid from below;

each of said ducts having a height of 0.3 to 1.5 m and a ratio of a smallest diameter to said height of said duct of substantially 1:3 to 1:15;

each of said ducts at said lower portion being provided with an annular conduit coaxial with said duct and having a multiplicity of bores for discharging water vapor into said liquid within said duct for inducing upward flow of said liquid in said duct; and

means for introducing water vapor into said annular conduit of each duct.

4,929,311

APPARATUS FOR DEODORIZING AN ORGANIC LIQUID

Helmut Saft, Niddatal, Fed. Rep. of Germany, assignor to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Apr. 27, 1989, Ser. No. 344,659

Claims priority, application Fed. Rep. of Germany, Apr. 27, 1988, 3814255

Int. Cl.[5] B01D 3/10, 3/38

U.S. Cl. 202—158 4 Claims

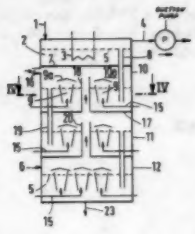
1. An apparatus for deodorizing an organic liquid, comprising:

a treatment vessel;

means connected with said treatment vessel for applying a subatmospheric pressure thereto;

means in said treatment vessel defining at least one treatment level upon which a body of predetermined height of an organic liquid to be deodorized is maintained and forming at said level at least two concentric upwardly open annular channel-like passages along which said body of liquid is conducted on said level, said concentric passages having a common cylindrical wall and a vertical partition extending across said passages transversly of the common wall, and an aperture in said wall adjacent said parition for allowing liquid flow between said passages;

each passage having a plurality of downwardly and upwardly open circulating ducts arranged in spaced relationship along each passage, each duct receiving said liquid from below and being traversed upwardly by said liquid



whereby said liquid overflows from an upper edge of said duct, each circulating duct having a frustoconical shape diverging upwardly with a cone angle A, measured against the vertical, of substantially 5° to 20°; and

means for introducing water vapor into said duct at a lower portion thereof for stripping said liquid with said water vapor and for inducing upward flow of said liquid in said duct.

4,929,312

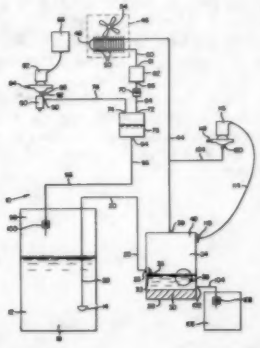
SOLVENT RECOVERY APPARATUS AND METHOD

Robert D. Westcott, 1073 N. Grant, Canby, Oreg. 97013

Filed Jan. 27, 1988, Ser. No. 148,996

Int. Cl.[5] B01D 3/42

U.S. Cl. 203—2 18 Claims



1. A solvent purification apparatus comprising:

a vessel for holding solvent, said vessel being open to the atmosphere;

evaporator means in fluid communication with said vessel for receiving contaminated solvent from said vessel and for vaporizing said solvent, said vaporizing of said solvent causing the separation of contaminants therefrom;

condensation means in fluid communication with said evaporator means for condensing said vaporized solvent;

accumulator means positioned between said condensation means and said vessel for temporarily storing condensed solvent received from said condensation means, said accumulator means comprising a primary accumulator chamber having an inlet communicating with said condensation

means and an outlet for directing condensed solvent from said condensation means back into said vessel;

depressurization means for establishing a negative pressure within said accumulator means, evaporator means and condensation means, said negative pressure enhancing the operating efficiency of said apparatus;

a condensate control valve between said inlet of said primary accumulator chamber and said condensation means, said control valve comprising sensing means for automatically responding to changes in pressure within said apparatus, said sensing means of said control valve causing said control valve to remain open only so long as said depressurization means maintains a negative pressure in said accumulator chamber and to automatically close when said accumulator chamber is at atmospheric pressure;

a solvent return valve communicating with the outlet of said accumulator chamber, said return valve comprising sensing means for automatically responding to changes in pressure within said apparatus, said sensing means of said return valve causing said return valve to remain closed only so long as said depressurization means maintains a negative pressure in said accumulator chamber and to automatically open when said accumulator chamber is at atmospheric pressure; and

control means operatively connected to said depressurization means for periodically allowing the accumulator chamber to return to atmospheric pressure.

4,929,313

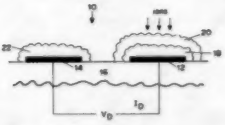
AMPEROMETRIC ELECTROCHEMICAL ION SENSORS AND METHOD FOR DETERMINING ION CONCENTRATION

Mark S. Wrighton, Winchester, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation-in-part of Ser. No. 674,410, Nov. 23, 1984, Pat. No. 4,721,601, and a continuation-in-part of Ser. No. 114,566, Oct. 29, 1987. This application Jan. 4, 1988, Ser. No. 140,621

Int. Cl.[5] G01N *27/30*

U.S. Cl. 204—153.1 **23 Claims**



1. An amperometric electrochemical sensor comprising:

a pair of electrically conductive electrodes each overlaid with electroactive polymeric material, at least one electrode having an ion-selective coating thereon, wherein said electrodes are electrically connected and said coating actively and selectively transports ions into the electroactive polymeric material effecting a change in the measured current correlated with the concentration of a substance to be measured.

12. A method for determining ion concentration comprising providing a pair of electrically conductive electrodes each overlaid with electroactive polymeric material, at least one electrode having an ion-selective coating thereon, wherein said electrodes are electrically connected and said coating actively and selectively transports ions into the electroactive polymeric material effecting a change in the measured current correlated with the concentration of a substance to be measured.

4,929,314

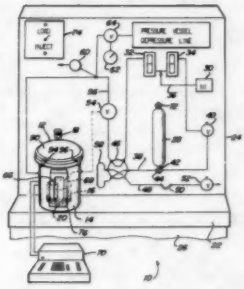
COULOMETRIC TITRATOR APPARATUS AND METHOD

Frederick Simonson, III, Port Allen, and Timothy M. Gunn, Baton Rouge, both of La., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jul. 7, 1989, Ser. No. 376,823

Int. Cl.[5] G01N *27/42*

U.S. Cl. 204—153.23 **15 Claims**



1. A coulometric titration apparatus for enabling a sample which is normally a vapor under atmospheric conditions to be analyzed in the liquid phase, comprising:

pressure vessel means for providing a chamber capable of being subjected to a predetermined pressure level which is above the vaporization level of said sample, said pressure vessel means being constructed to contain a titration vessel and permit said titration vessel to communicate with a coulometric titration analyzer;

regulator means for causing the pressure in said chamber to be maintained at said predetermined level; and

fluid control means for enabling said chamber to be purged with an inert gas and for injecting said sample into said titration vessel from a source of said sample.

13. A method of analyzing a sample by coulometric titration which is normally a vapor under atmospheric conditions, comprising the steps of:

enclosing a titration vessel within a chamber capable of being pressurized;

subjecting said chamber to a predetermined pressure level which is above the vaporization pressure of said sample by injecting an inert gas into said chamber;

loading a sample into a container which provides a predetermined volume; and

injecting said sample from said container into said titration vessel for analysis.

4,929,315

METHOD FOR ELECTROPLATING A CONDUCTING SURFACE

Siegfried Schaper, Wettstetten, and Martin Seufert, Kipfenberg, both of Fed. Rep. of Germany, assignors to Audi AG, Ingolstadt, Fed. Rep. of Germany

PCT No. PCT/EP87/00433, § 371 Date Feb. 9, 1989, § 102(e) Date Feb. 9, 1989, PCT Pub. No. WO88/03183, PCT Pub. Date May 5, 1988

PCT Filed Aug. 7, 1987, Ser. No. 328,033

Claims priority, application Fed. Rep. of Germany, Oct. 31, 1986, 3637088

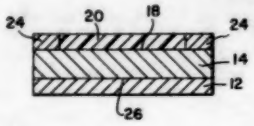
Int. Cl.[5] C25D *5/02*

U.S. Cl. 204—18.1 **11 Claims**

1. A process for galvanic coating of at least a selected area on a preform comprising,

(a) applying an electrically conducting metallic primer to substantially the entire surface of the preform;

(b) masking a portion of the surface coated leaving exposed an unmasked portion not to be coated;
(c) forming a clear coat to the exposed portion not to be galvanized;



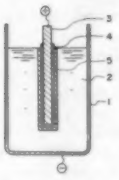
(d) removing the mask to expose the portion of the surface not clear coated; and
(e) galvanically coating the area of metallic primer.

4,929,316

METHOD OF MANUFACTURING ORGANIC SEMI-CONDUCTOR SOLID ELECTROLYTIC CAPACITOR

Yoshihiro Harakawa; Seiya Takahashi; Koji Izawa; Hidemitsu Takeuchi, and Keizo Ikari, all of Kawasaki, Japan, assignors to Niksuko Corporation, Kanagawa, Japan

Filed Aug. 30, 1989, Ser. No. 400,906
Claims priority, application Japan, Sep. 2, 1988, 63-219667
Int. Cl.[5] C25D *9/02*
U.S. Cl. 204—56.1 **10 Claims**



1. A method of manufacturing an organic semi-conductor solid electrolytic capacitor comprising at least the following means:
means for forming a dielectric oxide film on the surface of a metal substrate; and
means for forming a conductive polymer thin film layer of a heterocyclic compound on the surface of said dielectric oxide film by electrolytic oxidation polymerization carried out in an electrolytic solution which contains a heterocyclic compound and an aliphatic or aromatic sulfonic acid or a salt thereof as a supporting electrolyte in an organic solvent.

4,929,317

PROCESS FOR PREPARATION OF PERFLUORO ORGANIC COMPOUNDS

Masakatsu Nishimura, Tokuyama; Naoya Okada, Nanyo; Yasuo Murata, Kudamatsu, and Yasuhiko Hirai, Tokuyama, all of Japan, assignors to Tokuyama Soda Kabushiki Kaisha, Yamaguchi, Japan

Filed Dec. 1, 1987, Ser. No. 127,115
Claims priority, application Japan, Dec. 1, 1986, 61-284260; Dec. 1, 1986, 61-284261
Int. Cl.[5] C25C *3/08*
U.S. Cl. 204—59 R **10 Claims**

1. A process for the preparation of a perfluoro organic compound by perfluorination of an organic compound having carbon-to-hydrogen bonds, which consisting essentially of:
(i) a first step of fluorinating an organic compound having carbon-to-hydrogen bonds by electromechanical fluorination with anhydrous hydrogen fluoride for a time sufficient to form a mixture of a perfluoro organic compound with partially fluorinated organic compounds in which the ratio (F/H) of the number of fluorine atoms to the number of hydrogen atoms is at least 8; and
(ii) a second step of contacting substantially all of said mixture formed in said first step with molecular fluorine at a temperature of 110° to 180° C. to convert said partially fluorinated organic compounds to a perfluoro organic compound and recovering the perfluoro organic compound having no C-H bonds as the product.

4,929,318

PROCESS FOR PREPARING HALOGENATED ALKANE

Yasuhisa Furutaka; Hirokazu Aoyama, and Tsunetoshi Honda, all of Osaka, Japan, assignors to Daikin Industries Ltd., Osaka, Japan

Filed Sep. 21, 1988, Ser. No. 247,354
Claims priority, application Japan, Sep. 22, 1987, 62-238149; Dec. 29, 1987, 62-332719
Int. Cl.[5] B01J *19/12*
U.S. Cl. 204—157.6 **3 Claims**

1. A process for preparing a halogenated alkane of the formula:

R—CHXY (I)

wherein R is a trifluoromethyl group, a chlorodifluoromethyl group, a dichlorofluoromethyl group, a chlorofluoromethyl group, a difluoromethyl group, a fluoromethyl group or a 2-chloro-1,1,2,2-tetrafluoroethyl group, and X and Y are the same or different and are selected from hydrogen, chlorine or fluorine, which comprises reducing a halogenated alkane of the formula:

R—CClXY (II)

wherein R, X and Y are the same as defined above with the irradiation of light having a wavelength of not longer than 300 nm in an oxygen-free reaction atmosphere in the presence of 3 to 10 moles of an alcohol per mole of the halogenated alkane of the formula (II) or in the presence of 0.1 to 10 moles of an alcohol per mole of the halogenated alkane of the formula (II) and an alkali.

4,929,319

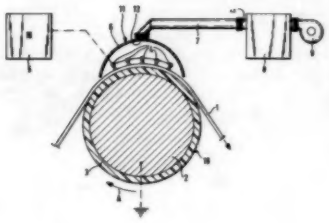
PROCESS AND DEVICE FOR SURFACE PRE-TREATMENT OF PLASTIC BY MEANS OF AN ELECTRICAL CORONA DISCHARGE

Peter Dinter, Hallgarten; Lothar Bothe, Mainz-Gonsenheim, and John D. Gribbin, Schlangenbad, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Feb. 17, 1988, Ser. No. 156,572
Claims priority, application Fed. Rep. of Germany, Feb. 20, 1987, 3705482
Int. Cl.[5] C07C *3/24*
U.S. Cl. 204—164 **11 Claims**

1. A process for corona-discharge surface pre-treatment of plastic, comprising the steps of:
producing an electrical corona discharge in a corona-discharge zone between at least one voltage-conducting electrode and a grounded counter-electrode;

placing a plastic article in the corona-discharge zone onto the surface of said grounded counter-electrode;
atomizing a liquid to produce an aerosol; and

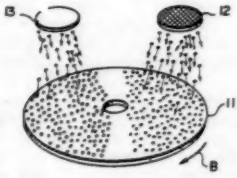


introducing the aerosol into the corona-discharge zone by means of a stream of gas.

4,929,320
METHOD OF MAKING MAGNETO-OPTICAL RECORDING MEDIUM

Takashi Yamada; Masaaki Nomura; Ryoichi Yamamoto; Satoshi Matsubaguchi, and Akira Nahara, all of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 179,022, Apr. 7, 1988, abandoned, which is a continuation-in-part of Ser. No. 36,484, Apr. 9, 1987, abandoned. This application Jun. 19, 1989, Ser. No. 368,107
Claims priority, application Japan, Apr. 11, 1986, 62-83720; Apr. 10, 1987, 62-87974
Int. Cl.[5] C23C *14/34*
U.S. Cl. 204—192.2 **9 Claims**

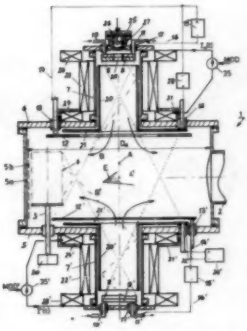


1. A method of making a magneto-optical recording medium by forming a magneto-optical recording layer on a substrate by simultaneously sputtering a transition metal and a rare earth metal onto the substrate comprising the steps of:
a. rotating the substrate in a predetermined direction beneath both a transition metal target and a rare earth metal target, said targets being separate from one another and each of said targets being located above a separate half region of said substrate;
b. sputtering a rare earth metal from the rare earth metal target onto a first half region of the surface of said substrate using radio frequency sputtering while said substrate is rotating;
c. simultaneously sputtering a transition metal from the transition metal target onto a second half region of said substrate using direct current sputtering while said substrate is rotating, and
d. continuing to sputter both the rare earth metal and the transition metal onto the substrate as the substrate rotates to deposit a layer of uniform thickness of rare earth metal and a layer of uniform thickness of transition metal with each rotation of the substrate to produce a first helical spiral formation consisting only of a rare earth metal overlaid with a second helical spiral formation consisting only of a transition metal such that in cross-section said magneto-optical recording layer comprises a plurality of thin transition metal layers of uniform thickness parallel to one another and obliquely oriented with respect to said substrate, and a plurality of thin rare earth metal layers of uniform thickness parallel to one another and obliquely oriented with respect to said substrate wherein adjacent transition metal layers are separated by an intervening rare earth metal layer and adjacent rare earth metal layers are separated by an intervening transition metal layer.

4,929,321
METHOD AND APPARATUS FOR COATING WORKPIECES

Rainer Buhl, Sargans, Switzerland, assignor to Balzers Aktiengesellschaft, Balzers, Liechtenstein

Filed Mar. 17, 1989, Ser. No. 325,301
Claims priority, application Switzerland, Mar. 23, 1988, 1095/88
Int. Cl.[5] C23C *14/32*
U.S. Cl. 204—192.38 **21 Claims**



1. A method for coating workpieces by arc evaporation, comprising the steps of:
evaporating ions from a cathode surface having an axis intersecting said surface;
arranging workpieces to be coated around said axis at locations radially outward and axially distant from said cathode surface;
providing visual shield means between said cathode surface and said workpieces at least partially surrounding said axis to prevent said workpieces from line of sight communication with said cathode surface; and
deflecting said ions radially outwardly around said visual shield means towards said workpieces.

4,929,322
APPARATUS AND PROCESS FOR ARC VAPOR DEPOSITING A COATING IN AN EVACUATED CHAMBER

Jiinjen A. Sue, Indianapolis, and Harden H. Troue, Plainfield, both of Ind., assignors to Union Carbide Corporation, Anbury, Conn.

Continuat'on of Ser. No. 906,514, Sep. 12, 1986, abandoned, which is a continuation-in-part of Ser. No. 781,460, Sep. 30, 1985, abandoned. This application Jun. 8, 1989, Ser. No. 363,332
Int. Cl.[5] C23C *14/34;* B05D *3/06*
U.S. Cl. 204—192.38 **23 Claims**

1. A process for coating an object with source material in a vacuum chamber which comprises;
(a) providing within said vacuum chamber a solid cathode and an anode with each being spaced apart from one another and from said object and with said cathode having

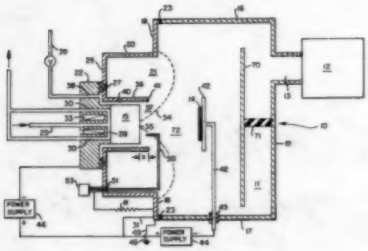
an evaporable and surface for supplying said source material;

(b) arranging said cathode in said vacuum chamber with its evaporable end surface facing said object;

(c) evacuating said vacuum chamber to an operating pressure of between 10^{-1} and 5×10^{-4} torr;

(d) surrounding said cathode with an elongated member uniform in cross sectional dimension over its length to form a narrow space between the elongated member and said cathode with said elongated member having an open end extending beyond the evaporable end surface of the cathode a distance calculated from the ratio of x/d of from 0.07 to 2 forming a cathode chamber between said evaporable end surface and said open end where "x" represents the axial dimension between said evaporable end surface and said open end and "d" represents the major dimension of the cross-section of said evaporable end surface;

(e) generating an electric arc between the evaporable end surface of the cathode and the anode;



(f) maintaining said elongated member electrically insulated from both the cathode and the anode for preventing arcing between the cathode and said member and from between said member and the anode;

(g) introducing gas into said narrow space at a pressure higher than the operating pressure established within the vacuum chamber and in a direction so as to envelop the arc in said cathode chamber before entering the vacuum chamber such that the arc termination at the cathode is confined to the evaporable end surface with the arc caused to traverse a path extending from said evaporable end surface around the open end of said elongated member to said anode;

(h) withdrawing gas from the vacuum chamber to maintain the pressure within the vacuum chamber at said operating pressure; and

(i) depositing a coating of source material upon the object.

4,929,323

APPARATUS FOR REMOVING ELECTROPLATING METAL DEPOSITED ONTO SURFACE OF CONDUCTOR ROLL

Tsutomu Watanabe; Masari Sagiyama; Masaki Kawabe; Toshiyuki Tsujihara, and Shigehiro Takushima, all of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan

PCT No. PCT/JP88/01284, § 371 Date Aug. 14, 1989, § 102(e) Date Aug. 14, 1989, PCT Pub. No. WO89/05875, PCT Pub. Date Jun. 29, 1989

PCT Filed Dec. 19, 1988, Ser. No. 392,985

Claims priority, application Japan, Dec. 18, 1987, 62-322318

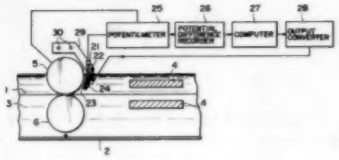
Int. Cl.[5] C25D *17/00*

U.S. Cl. 204—206 **1 Claim**

1. An apparatus for removing an electroplating metal deposited onto the surface of a conductor roll, comprising:

a reverse-electrolyzing electrode (**23**), provided in an electroplating solution (**3**) in a horizontal type electroplating tank (**2**), near a conductor roll (**5**), the lower portion of which is immersed in said electroplating solution (**3**), for electrolytically removing an electroplating metal deposited onto the surface of said conductor roll (**5**), the surface of said reverse-electrolyzing electrode (**23**), except for the portion facing said conductor roll (**5**), being electrically shielded by mean of an insulating cover (**24**);

a reference electrode (**21**), at least the lower portion of which is immersed in said electroplating solution (**3**), provided near said conductor roll (**5**), the surface of said reference electrode (**21**), except for the portion facing said conductor roll (**5**), being electrically shielded by means of an insulating cover (**22**);



a reverse-electrolyzing electrode moving mechanism (**30**) for causing said reverse-electrolyzing electrode (**23**) to return-travel, together with said reference electrode (**21**), in the axial direction of said conductor roll (**5**);

a potentiometer (**25**) for continuously measuring a value of potential difference between said reference electrode (**21**) and said conductor roll (**5**); and

an output converter (**28**) for controlling the start and the end of said electrolytic removal of said electroplating metal deposited onto the surface of said conductor roll (**5**) by means of said reverse-electrolyzing electrode (**23**), on the basis of said value of potential difference as measured by means of said potentiometer (**25**).

4,929,324

APPARATUS FOR REMOVING ELECTROPLATING METAL DEPOSITED ONTO SURFACE OF CONDUCTOR ROLL

Tsutomu Watanabe; Masaru Sagiyama; Masaki Kawabe; Toshiyuki Tsujihara, and Shigehiro Takushima, all of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan

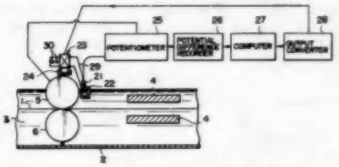
PCT No. PCT/JP88/01283, § 371 Date Aug. 14, 1989, § 102(e) Date Aug. 14, 1989, PCT Pub. No. WO89/05874, PCT Pub. Date Jun. 29, 1989

PCT Filed Dec. 19, 1988, Ser. No. 392,972

Claims priority, application Japan, Dec. 18, 1987, 62-322316

Int. Cl.[5] C25D *17/00*

U.S. Cl. 204—206 **1 Claim**



1. An apparatus for removing an electroplating metal deposited onto the surface of a conductor roll, comprising:

a scraper (**23**), provided above a conductor roll (**5**), the lower portion of which is immersed in an electroplating solution (**3**) in a horizontal type electroplating tank (**2**), for scraping off an electroplating metal deposited onto the surface of said conductor roll (**5**);

a reference electrode (**21**), at least the lower portion of which is immersed in said electroplating solution (**3**), provided near said conductor roll (**5**), the surface of said

reference electrode (21), except for the portion facing said conductor roll (5), being electrically shielded by means of an insulating cover (22);

a scraper moving mechanism (30) for causing said scraper (23) to return-travel, together with said reference electrode (21), in the axial direction of said conductor roll (5);

a potentiometer (25) for continuously measuring a value of potential difference between said reference electrode (21) and said conductor roll (5); and

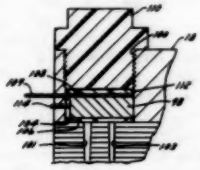
an output converter (28) for controlling the start and the end of said scraping of said electroplating metal deposited onto the surface of said conductor roll (5) by means of said scraper (23), on the basis of said value of potential difference as measured by means of said potentiometer (25).

4,929,325

REMOVABLE PROTECTIVE ELECTRODE IN A BIPOLAR BATTERY

Gerald K. Bowen, Cedarburg, and Jeffrey P. Zagrodnik, Hales Corners, both of Wis., assignors to Globe-Union Inc., Milwaukee, Wis.

Filed Sep. 8, 1988, Ser. No. 241,714
Int. Cl.[5] H01M *8/24*; C25B *9/00*
U.S. Cl. 204—268 **13 Claims**



1. An electrode protective assembly for use in a bipolar battery having a plurality of electrodes, each with an anodic surface and a cathodic surface with each electrode being separated by an ionic penetratable separator, said electrodes positioned between end blocks, at least one pair of tunnels adapted to respectively carry aqueous anolyte and catholyte to respective anodic and cathodic surfaces and a corresponding number of shunt tunnels extending from one end block to the other and adapted to carry aqueous anolyte and catholyte, said assembly including:

means removably positioned in a bore of one of said end blocks for electrically contacting an electric current source and said aqueous anolyte and catholyte in said shunt tunnels, and

means for removably securing said electrically contacting means in said bore of said one end block.

4,929,326

ELECTROLYTIC TREATMENT APPARATUS

Akio Uesugi; Ritsu Dobashi, and Takeshi Ohishi, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jul. 3, 1989, Ser. No. 374,797
Claims priority, application Japan, Jul. 4, 1988, 63-164906
Int. Cl.[5] C25F *7/00*
U.S. Cl. 204—206 **6 Claims**

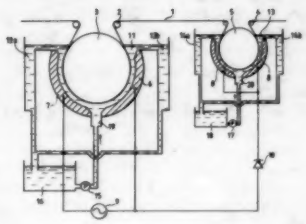
1. An electrolytic treatment apparatus for applying an electrochemical treatment to a material to be treated in an electrolyte, the apparatus comprising:

a main counter electrode;

an auxiliary counter electrode consisting of an electrode containing magnetic iron oxide;

a first circuit connected to the main counter electrode including an alternating current source;

a second circuit for the auxiliary counter electrode connected to the first circuit in parallel; and



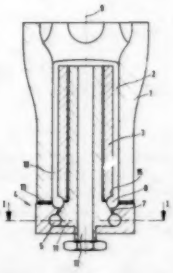
diode means for performing a diode-like action in the second circuit so as to control an anode current passing through the main counter electrode.

4,929,327

ARRANGEMENT FOR PRODUCING DISPERSION LAYERS

Goetz Mielsch, Munich, Fed. Rep. of Germany, assignor to Bayerische Motoren Werke AG, Fed. Rep. of Germany

Filed Dec. 7, 1988, Ser. No. 280,941
Claims priority, application Fed. Rep. of Germany, Dec. 16, 1987, 3742602
Int. Cl.[5] C25D *17/00*
U.S. Cl. 204—272 **12 Claims**



1. An arrangement for depositing variable thickness dispersion layers on inner surfaces of hollow cylinders open at least on one side thereof, comprising anode means, swirl-producing flow body means, an electrolyte together with solid particles to be deposited being conducted to contact the inner surface of the hollow cylinder to be coated and along the outer circumference of the anode means arranged substantially centrally in the cylinder axis, the electrolyte being conducted into the cylinder by means of the swirl-producing flow body means, and the swirl-producing flow body means conducting the electrolyte in such a manner that the electrolyte flow is divided into a laminar and a turbulent portion to deposit a thicker layer of electrolyte on the cylinder inner surface where the turbulent portion contacts the cylinder and a thinner layer where the laminar portion contacts the cylinder.

4,929,328
TITANIUM DIBORIDE CERAMIC FIBER COMPOSITES FOR HALL-HEROULT CELLS

Theodore M. Besmann, and Richard A. Lowden, both of Knoxville, Tenn., assignors to Martin Marietta Energy Systems, Inc., Oak Ridge, Tenn.

Filed Mar. 7, 1989, Ser. No. 319,770
Int. Cl.[5] C25C *7/02*
U.S. Cl. 204—279 20 Claims

18. A cathode structure for use in a Hall-Heroult electrolysis cell for aluminum smelting, which comprises:

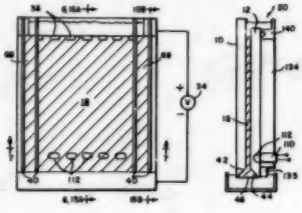
a preform matrix of matrix of fibers selected from fibers of silicon carbide, carbon, alumina, mullite, aluminum nitride, boron nitride and mixtures thereof, said preform matrix provided with means for mounting said cathode in said cell; and

an infiltration of titanium diboride throughout said preform matrix to coat said fibers and provide a substantially theoretical density to said cathode, said infiltration being a result of passing hydrogen, boron trichloride and titanium tetrachloride through said preform matrix while maintaining said preform matrix at about 900 deg. C.

4,929,329
ELECTROPHORESIS CASSETTE SYSTEM WITH APPARATUS AND METHOD FOR FILLING SAME

Philip C. Danby, Chestnut Hill, Mass.; Hal C. Danby, Sudbury, England, and Eric R. Hungerman, Woburn, Mass., assignors to EG&G, Inc., Wellesley, Mass.

Continuation-in-part of Ser. No. 43,212, Apr. 27, 1987, abandoned. This application Dec. 2, 1987, Ser. No. 127,655
Int. Cl.[5] G01N *27/26*
U.S. Cl. 204—299 R 36 Claims



1. An electrophoresis cassette, comprising:

a first flat plate having two sides which are substantially parallel to each other and having top and bottom edges;

a second flat plate having two sides which are substantially parallel to each other and having top and bottom edges;

means for holding the first and second plate in a fixed relationship with each other wherein the sides of the first plate are substantially parallel to the sides of the second plate and the opposing faces of the plates are separated by a predetermined distance to form a space therebetween, the sides, bottom edges and top edges of the plates corresponding to the sides, bottom edge and top edge of the assembled cassette;

the space between the plates being adapted for filling with a gel in which an electrophoresis separation may be performed;

the means for holding including;

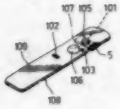
means for providing a line contact seal between the first and second plates along each of the sides of the cassette immediately adjacent to said space adapted to be filled with a gel, and including at least one elongate sealing piece along each side of the space which serves both to provide said line contact seal and to maintain the separation between the plates at said predetermined distance; and

means for clamping the two plates together along the side thereof.

4,929,330
DIFFUSION-LIMITING MEMBRANE HOLDING MEANS FOR SENSOR

Tatsuhiko Osaka, Kurita; Hiroshi Terawaki, Kouka, and Mitsunari Okamoto, Sakai, all of Japan, assignors to Daikin Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 176,287, Mar. 31, 1988, abandoned. This application Oct. 16, 1989, Ser. No. 423,533
Claims priority, application Japan, Mar. 31, 1987, 62-49736; Apr. 30, 1987, 62-65508; Apr. 30, 1987, 62-65507; Dec. 26, 1987, 62-197711; Dec. 26, 1987, 62-197708
Int. Cl.[5] G01N *27/30*
U.S. Cl. 204—402 22 Claims



1. A diffusion-limiting membrane holding means for a sensor, comprising:

a thin resilient plate provided in a predetermined position with an opening through which a target solution to be measured is adapted to penetrate, said thin resilient plate adapted to be bent into operative position; and

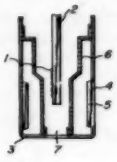
a diffusion-limiting membrane for limiting diffusion of the target solution attached to said thin resilient plate so as to cover said opening, and said diffusion-limiting membrane being dimensioned and attached to said resilient plate such that, upon a bending of said resilient plate into operative position, said plate causes a similar bending in said attached membrane.

10. A diffusion-limiting membrane holding means for a sensor as set forth in claim 1, wherein said thin resilient plate is provided at a predetermined position thereof with a housing portion for housing a standard solution for calibration, said housing portion being adapted to supply the standard solution for calibration to the opening.

4,929,331
OXYGEN SENSOR

Nobuhide Kato, Ama, and Yasuhiko Hamada, Nagoya, both of Japan, assignors to NGK Insulators, Ltd., Japan

Filed Jan. 24, 1989, Ser. No. 300,972
Claims priority, application Japan, Jan. 29, 1988, 63-9730[U]
Int. Cl.[5] G01N *27/46*
U.S. Cl. 204—426 6 Claims



1. An oxygen sensor, comprising:

a planar oxygen sensor element having a measuring electrode arranged on a broad width surface thereof;

a protective cover surrounding the planar sensor element, said protective cover having gas inlet holes through which a gas to be measured is introduced into said protec-

tive cover and at least one gas outlet hole at a central portion of a bottom end thereof through which the gas exits said protective cover after measurement and having no gas vent hole on its side wall, said at least one gas outlet hole being defined by a wall member upwardly protruding from the bottom of said protective cover; and

a cylindrical body provided between the protective cover and the planar oxygen sensor element, said cylindrical body having a first open end and a second open end opposed to said first open end, said second open end being fixed to said wall member upwardly protruding from the bottom of said protective cover;

wherein said cylindrical body isolates said planar oxygen sensor element from direct contact with the measurement gas.

4,929,332

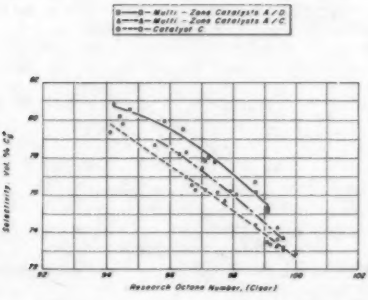
MULTIZONE CATALYTIC REFORMING PROCESS

Mark D. Moser, Elk Grove Village; R. Joe Lawson, Palatine; George J. Antos, Elgin, all of Ill.; Li Wang, Huntington, Conn., and Vivekanand N. Parulekar, Wichita, Kans., assignors to UOP, Des Plaines, Ill.

Filed Feb. 6, 1989, Ser. No. 306,731

Int. Cl.[5] C10G *35/085*

U.S. Cl. 208—65 **15 Claims**



1. A process for the catalytic reforming of hydrocarbons comprising contacting the hydrocarbon feed in two sequential catalyst zones, wherein:

(a) a first catalyst zone contains a first catalytic composite consisting essentially of a platinum component, a germanium component, a refractory inorganic oxide, and a halogen component; and

(b) a second catalyst zone contains a second catalytic composite comprising a platinum component, a germanium component, a refractory inorganic oxide, a halogen component, and catalytically effective amounts of a metal promoter selected from rhenium, rhodium, ruthenium, cobalt, nickel, and iridium, and mixtures thereof.

4,929,333

MULTIZONE CATALYTIC REFORMING PROCESS

Mark D. Moser, Elk Grove Village; R. Joe Lawson, Palatine, both of Ill.; Li Wang, Huntington, Conn., and Vivekanand N. Parulekar, Wichita, Kans., assignors to UOP, Des Plaines, Ill.

Filed Feb. 6, 1989, Ser. No. 306,732

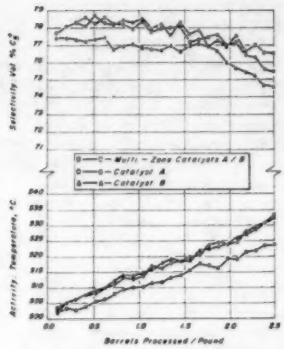
Int. Cl.[5] C10G *35/085*

U.S. Cl. 208—65 **16 Claims**

1. A process for the catalytic reforming of hydrocarbons comprising contacting the hydrocarbon feed in two sequential catalyst zones, wherein:

(a) an initial catalyst zone contains an initial catalytic composite comprising a platinum component, a germanium component, a refractory inorganic oxide, and a halogen component; and

(b) a terminal catalyst zone contains a terminal catalytic composite having the essential absence of germanium and comprising a platinum component, a refractory inorganic oxide, a halogen component, and catalytically effective



amounts of a metal promoter selected from rhenium, indium, rhodium, ruthenium, cobalt, nickel, iridium, and mixtures thereof.

4,929,334

FLUID-BED REACTION PROCESS

Mohsen N. Harandi, Lawrenceville, and Hartley Owen, Belle Mead, both of N.J., assignors to Mobil Oil Corp., New York, N.Y.

Filed Nov. 18, 1988, Ser. No. 272,958

Int. Cl.[5] C10G *57/00*

U.S. Cl. 208—91 **10 Claims**

1. A process for the conversion of hydrocarbons comprising the steps of:

(a) fluidizing a finely divided dehydrogenation catalyst in a dehydrogenation reaction zone;

(b) withdrawing spent dehydrogenation catalyst from said dehydrogenation reaction zone;

(c) contacting an aliphatic feedstream with said spent dehydrogenation catalyst in a preheat zone to preheat said aliphatic feedstream and to convert at least a portion of the coke precursors in the aliphatic feedstream to coke;

(d) depositing said coke on said spent dehydrogenation catalyst in said preheat zone;

(e) withdrawing said spent dehydrogenation catalyst from said preheat zone of step (c);

(f) charging said preheated aliphatic feedstream of step (d) to said dehydrogenation reaction zone of step (a) under dehydrogenation conversion conditions;

(g) stripping hydrocarbon from said spent dehydrogenation catalyst;

(h) regenerating said spent dehydrogenation catalyst; and

(i) recycling regenerated dehydrogenation catalyst to said dehydrogenation reaction zone.

4,929,335

METHOD FOR CONTROL OF VISBREAKER SEVERITY

Lawrence J. Altman; Byung C. Choi, both of Cherry Hill, and Grant G. Karsner, Voorhees Township, Camden County, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 222,858, Jul. 22, 1988, Pat. No. 4,880,748. This application Jul. 28, 1989, Ser. No. 386,173

Int. Cl.[5] C10G *9/00*

U.S. Cl. 208—106 **5 Claims**

1. A method for controlling the severity of visbreaking, which method comprises:

sampling the effluent from a visbreaker;

preparing three blends of said effluent with a distillate cutter stock, the first at a viscosity higher than that of a specific viscosity for the visbroken product, the second at a viscosity about equal to the specific viscosity, and the third at a viscosity lower than the specific viscosity;

measuring the total light absorbance of each of said blends at a selected wavelength in the range of 1200 to 3000 nm to determine the presence or absence of incompatible sediment by the total light absorbance of said samples at the selected wavelength;

and adjusting visbreaker severity as needed to maintain compatibility in said first and second samples as evidenced by the absence of incompatible sediment in said first and second samples and to force incompatibility on said third sample as evidenced by the formation during the visbreaking of incompatible sediment.

4,929,336

TREATMENT OF SPENT CRACKING CATALYSTS

Richard E. Lowery, Tulsa; Chia M. Fu, Bartlesville, and Michael K. Maholland, Bartlesville, all of Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 12, 1989, Ser. No. 420,790

Int. Cl.[5] C10G *11/05*

U.S. Cl. 208—120 **34 Claims**

18. A catalytic cracking process comprising the step of contacting a hydrocarbon-containing feed stream with a zeolite-containing catalytic cracking catalyst composition, under such cracking conditions as to obtain at least one normally liquid hydrocarbon-containing product stream having a lower initial boiling point and higher API gravity than said hydrocarbon-containing feed stream;

wherein at least a portion of said cracking catalyst composition is a reactivated spent catalyst composition having undergone a reactivation process comprising the steps of

(a) contacting a spent zeolite-containing catalytic cracking catalyst composition, which contains at least one metal contaminant and at least a portion of which has previously been used in a catalytic cracking process, with an acidified aqueous solution of ammonium nitrate having a pH in the range of from about 0 to about 5, under such contacting conditions as to enhance the catalytic cracking activity of said cracking catalyst composition;

(b) at least partially separating the cracking catalyst composition having enhanced cracking activity obtained in step (a) from said solution used in step (a); and

(c) contacting the at least partially separated cracking catalyst composition having undergone steps (a) and (b) with at least one fluorine compound selected from the group consisting of NH_4F, NH_4HF_2 and HF, under such conditions as to enhance the catalyst cracking activity of the catalyst composition having undergone steps (a) and (b).

4,929,337

PROCESS FOR CATALYTIC CRACKING OF HEAVY HYDROCARBON FEED TO LIGHTER PRODUCTS

Joseph A. Herbst, Turnersville; Hartley Owen, Belle Mead, both of N.J., and Paul H. Schipper, Wilmington, Del., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 30, 1988, Ser. No. 292,205

Int. Cl.[5] C10G *11/05, 35/095*; C07C *2/12, 5/22*

U.S. Cl. 208—120 **3 Claims**

1. A process for catalytic cracking of a feed of hydrocarbons boiling in the gas oil and heavier boiling range to lighter products by contacting the feed at catalytic cracking conditions and catalytically cracking the feed to lighter products with a cracking catalyst comprising a mixture of separate particles of:

(a) a bulk conversion cracking catalyst containing at least one component with an equivalent pore size of at least about 7 angstroms in a matrix, said bulk conversion cracking catalyst having fluidization properties which permit use in a fluidized or moving bed catalytic cracking reactor;

(b) a light paraffin upgrading catalyst comprising at least one zeolite having a constraint index of 1–12 and paraffin cracking/isomerization activity; and,

(c) a light paraffin upgrading catalyst comprising at least one zeolite having a constraint index of 1–12 and paraffin aromatization activity; and

wherein said upgrading catalysts have substantially the same fluidization properties as the bulk conversion cracking catalyst.

4,929,338

CATALYTIC CRACKING CATALYST AND PROCESS

Richard F. Wormsbecher, Baltimore, Md., assignor to W. R. Grace & Co. - Conn., New York, N.Y.

Continuation of Ser. No. 942,648, Dec. 17, 1986, abandoned, which is a division of Ser. No. 739,645, May 31, 1985, abandoned, which is a continuation-in-part of Ser. No. 487,165, Apr. 21, 1983, abandoned, and Ser. No. 689,280, Jan. 7, 1985, abandoned. This application Dec. 19, 1988, Ser. No. 286,096

Int. Cl.[5] C10G *11/14*

U.S. Cl. 208—120 **10 Claims**

1. In a method for the catalytic cracking of vanadium containing hydrocarbons wherein said hydrocarbon is reacted under catalytic cracking conditions in the presence of catalyst which comprises synthetic faujasite dispersed in an inorganic oxide matrix, the improvement comprising conducting the reaction in the presence of a catalyst which includes from about 5 to 80 percent by weight expressed as the oxides of a composition for scavenging vanadium which comprises a magnesia-silica gel having the weight composition 30 to 80 percent MgO, a pore volume of at least 0.1 cc/g in pores having an average pore diameter of greater than about 600 Å in pores which range from about 200 to 10,000 Å in diameter.

4,929,339

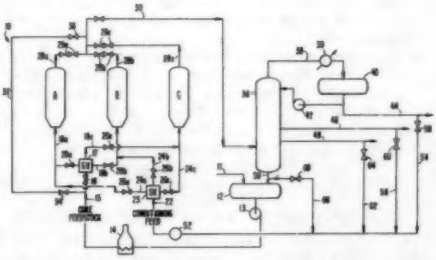
METHOD FOR EXTENDED CONDITIONING OF DELAYED COKE

John D. Elliott, Jr., Randolph, N.J., and Robert DeBiase, Staten Island, N.Y., assignors to Foster Wheeler U.S.A. Corporation, Clinton, N.J.

Continuation-in-part of Ser. No. 588,635, Mar. 12, 1984, abandoned. This application Oct. 7, 1985, Ser. No. 784,950

Int. Cl.[5] C10G *9/14*

U.S. Cl. 208—131 **8 Claims**



1. A delayed coking process for producing conditioned anisotropic coke comprising the steps of:

forming coke in a first of a plurality of coke drums including feeding coke feedstock to the first drum at an elevated temperature;

conditioning the coke in the first drum at an elevated temperature to lower its volatile matter content and increase its hardness and crystallinity;

decoking the first drum;

forming coke in a second of said coke drums, including feeding coke feedstock to the second drum at an elevated

temperature, during the conditioning of the coke in the first drum;

conditioning the coke in the second drum at an elevated temperature to lower its volatile matter content and increase its hardness and crystallinity during the decoking of the first drum;

decoking the second drum;

forming coke in a third of said coke drums, including feeding coke feedstock to the third drum at an elevated temperature, during the conditioning of the coke in the second drum;

conditioning the coke in the third drum at an elevated temperature to lower its volatile matter content and increase its hardness and crystallinity during the decoking of the second drum; and

decoking the third drum,

wherein each step of conditioning the coke at an elevated temperature comprises flowing through the coke a conditioning fluid having a temperature of more than 750° F. and less than 1000° F.

4,929,340

CATALYST AND PROCESS FOR SWEETENING A SOUR HYDROCARBON FRACTION USING DIPOLAR COMPOUNDS

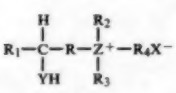
Sheila Pollastrini, Bloomingdale; Jeffery C. Bricker, Buffalo Grove, and Robert R. Frame, Glenview, all of Ill., assignors to UOP, Des Plaines, Ill.

Filed Jul. 31, 1989, Ser. No. 386,923

Int. Cl.[5] C10G *19/00, 27/00, 29/00*

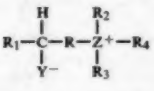
U.S. Cl. 208—189 **22 Claims**

1. In a process for treating a sour hydrocarbon fraction containing mercaptans comprising contacting the hydrocarbon fraction in the presence of an oxidizing agent with a basic solution containing a metal chelate effective in oxidizing said mercaptans to disulfides, the improvement comprising a dipolar compound present in the basic solution, the dipolar compound having the structural formula



(A)

where Z is nitrogen or phosphorus, R is a linear alkyl group having from one to about 18 carbon atoms, R_1 and R_2 are each individually hydrogen or a hydrocarbon group selected from the group consisting of alkyl, aryl, alkaryl, aralkyl and cycloalkyl, R_3 and R_4 are each individually a hydrocarbon group selected from the group consisting of alkyl, aryl, alkaryl, aralkyl and cycloalkyl, YH is an electronegative group selected from the group consisting of OH, SH, COOH, SO_3H and NH_2, the electronegative group characterized in that it is capable of being deprotonated in a basic solution, and X is an anion selected from the group consisting of the halogens, and hydroxide; or the structural formula



(B)

where Y^- is the deprotonated form of YH.

4,929,341

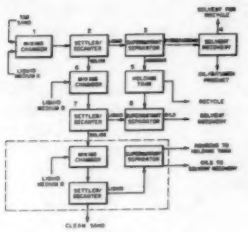
PROCESS AND SYSTEM FOR RECOVERING OIL FROM OIL BEARING SOIL SUCH AS SHALE AND TAR SANDS AND OIL PRODUCED BY SUCH PROCESS

M. Jeersannidhi Thirumalachar, and M. Jeersannidhi Narasimhan, Jr., both of Walnut Creek, Calif., assignors to Source Technology Earth Oils, Inc., Walnut Creek, Calif.

Continuation-in-part of Ser. No. 633,942, Jul. 24, 1984, abandoned, which is a continuation of Ser. No. 416,507, Sep. 10, 1982, abandoned. This application Apr. 28, 1986, Ser. No. 856,811

Int. Cl.[5] C10G *1/00*

U.S. Cl. 208—390 **11 Claims**



3. A process for recovering bitumen from tar sand comprising the steps of:

(a) contacting tar sand in a first contacting zone with a first liquid medium comprising an intimately mixed, phase emulsion comprising (1) about 10 to about 40 volume percent of a solvent and (2) about 60 to about 90 volume percent of an aqueous solution comprising water, about 0.025 to about 0.5 weight percent of a surfactant and about 0.1 to about 5.0 weight percent of a non-caustic alkali compound;

(b) mixing said tar sand and said first liquid medium to release bitumen from the tar sand;

(c) separating the released bitumen and solvent from the mixture of step (b) from the remaining sand;

(d) contacting the remaining sand with a second liquid medium comprising an aqueous solution comprising water, about 0.025 to about 0.5 weight percent of a surfactant and about 0.1 to about 5.0 weight percent of a non-caustic alkali compound;

(e) mixing said remaining sand and said second liquid medium to further release bitumen from the sand and

(f) recovering the further released bitumen from the mixture of step (e).

4,929,342

APPARATUS AND METHOD FOR SEPARATING RECYCLABLE MATERIALS

Gerald Johnston, Vestaburg, Mich., assignor to Lenco Machines & Tool Co., Vestabury, Mich.

Filed Dec. 23, 1988, Ser. No. 290,183

Int. Cl.[5] B03C *1/30;* **B07B** *15/00*

U.S. Cl. 209—12 **17 Claims**

1. An apparatus for separating recyclable materials, comprising:

a frame;

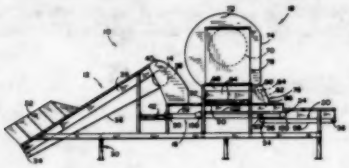
a conveying mechanism mounted on said frame and including a magnetic element thereon, said conveying mechanism adapted to convey a flow of said recyclable materials and said magnetic element disposed and adapted to direct magnetic materials out of said recyclable material flow;

a vacuum inducing mechanism mounted on said frame and disposed adjacent said conveying mechanism so as to pull materials having a preselected lighter weight from said recyclable material flow, said vacuum inducing mecha-

nism having a vacuum discharge region for discharging said lighter weight materials;

a size separator mechanism disposed at said vacuum discharge region;

said conveying mechanism having a heavy material collecting region, whereby said apparatus separates said metallic



material from the remainder of said recyclable materials, said lighter weight materials such as aluminum, plastic and the like are pulled from the remainder of said recyclable materials and sorted by size, and non-magnetic heavy materials such as glass and the like are collected at said heavy material collecting region.

4,929,343

NOVEL COLLECTORS AND PROCESSES FOR MAKING AND USING SAME

Samuel S. Wang, Cheshire, and D. R. Nagaraj, Stamford, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 108,611, Oct. 15, 1987, Pat. No. 4,871,466. This application Jul. 5, 1989, Ser. No. 375,443

Int. Cl.[5] B03D *1/01, 1/008, 1/018*

U.S. Cl. 209—166 **16 Claims**

1. In a froth flotation process for beneficiating a non-sulfide ore containing value and impurity minerals comprising slurrying said ore in an aqueous medium, conditioning said slurry with effective amounts of a frothing agent and a collector selective for only one of said value or impurity minerals and frothing the slurry to produce a concentrate containing said value minerals by froth flotation, the improvement comprising employing, as the collector, a composition comprising a mixture of water, a C_8–C_{22} alcohol, a fatty hydroxamic acid salt of 6–22 carbon atoms and an alkali metal sulfate.

4,929,344

METALS RECOVERY BY FLOTATION

Shane D. Fleming, Montville, N.J., assignor to American Cyanamid, Stamford, Conn.

Filed May 1, 1989, Ser. No. 345,749

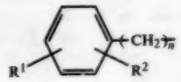
Int. Cl.[5] B03D *1/02*

U.S. Cl. 209—166 **11 Claims**

1. In a froth flotation process for beneficiating a gold, silver or platinum group ore comprising slurrying liberation-sized particles of said ore in an aqueous medium, conditioning the resultant slurry with effective amounts of a frothing agent and a collector, respectively, and floating the desired gold, silver or platinum group minerals by froth flotation methods, the improvement comprising: conducting said flotation step at a pH of above 7.0 and in the presence of a primary collector for said gold, silver or platinum group minerals consisting essentially of at least one monothiophosphate compound having the formula:

$$(RO)_2\overset{\overset{S}{\|}}{P}O^-.X^+$$

wherein each R is, individually, selected from C_2–C_8 alkyl and



radicals wherein R^1 and R^2 are, individually, hydrogen or C_1–C_4 alkyl radicals, n is 0 or 1 and X is a cation, alone or in combination with an auxiliary collector selected from the group consisting of xanthates, dithiophosphates, dithiophosphinates, thioureas and mercaptobenzothiazoles and selectively recovering the gold, silver or platinum group metal from said froth.

4,929,345

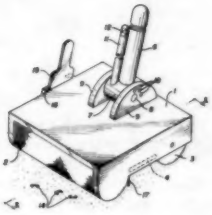
CARPET SWEEPER

Hilman J. Meador, 2712 Dick Taylor St., Monroe, La. 71202-3216

Filed Jul. 6, 1989, Ser. No. 375,883

Int. Cl.[5] B03C *1/30*

U.S. Cl. 209—215 **9 Claims**



1. A carpet sweeper comprising a base member, a wire mesh fabric secured to the forward end of said base member and engaging the surface of the carpet to be swept, magnetic means secured to the bottom of the base member adjacent the wire mesh fabric, handle means secured to the base member to thereby facilitate the manual pushing of the sweeper over the carpet to be cleaned, whereby the mechanical action of the wire mesh fabric dislodges metallic fasteners caught in the carpet, and the magnetic force of the magnet attracts and accumulates the dislodged fasteners away, from the carpet, and a scraper attachably connected to the base member for manually removing accumulated metallic fasteners from the magnetic means.

4,929,346

VIBRATORY SEPARTOR SCREEN ASSEMBLY

Yu Si-Lin, No. 67, 38th Alley, Kuang-Fu Rd., Sec. 2, San-Chung City, Taiwan

Filed Jan. 20, 1988, Ser. No. 145,912

Int. Cl.[5] B07B *1/28*

U.S. Cl. 209—323 **7 Claims**

1. A screen structure for vibratory separator comprising:

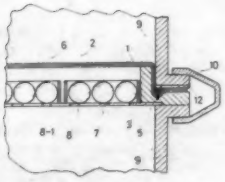
a screen frame for supporting screens, the screen frame including an upstanding wall having an upper edge and having a radially outwardly extending edge flange around the upstanding wall down from the upper edge of the screen frame;

a coarse screen placed atop the upper edge of the frame wall, and including a first peripheral edge portion wrapped down the outside of the frame wall and secured stretched tight to the edge flange of the screen frame, and attaching means attaching the coarse screen to the edge flange;

a main screen laid on top of the coarse screen and extending across the surface of the coarse screen, the main screen including a second peripheral edge portion which also

extends down the outside of the upstanding wall of the screen frame on the outside of the coarse screen and then extends over the edge flange of the screen frame above the coarse screen on the edge flange, said main screen being removable from said screen frame while the coarse screen remains stretched tight and attached to the edge flange of the screen frame by the attaching means;

an upper spacing frame projecting above the screen frame and above the screens supported on the screen frame, and the upper spacing frame having a wall which extends down past and outside the wall of the screen frame down to the edge flange of the screen frame; the upper spacing frame having a first peripheral flange which extends radially outwardly from the wall thereof above the screens which are on the edge flange of the screen frame, and the



upper frame being pressed down toward the edge flange of the screen frame for squeezing the screens between the first peripheral flange of the upper spacing frame and the edge flange of the screen frame;

a lower spacing frame disposed beneath and extending down from the edge flange of the screen frame, the lower spacing frame also including a second peripheral flange projecting radially outwardly and also disposed below the edge flange of the screen frame;

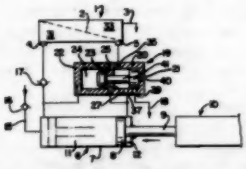
a V clamp ring extending around the periphery of the structure and around the first and second peripheral flanges, the clamp ring having legs which sandwich between them the first peripheral flange of the upper spacing frame and the second peripheral flange of the lower spacing frame and clamps the peripheral flanges together over the edge flange and the coarse screen and the main screen.

4,929,347

CONCENTRATING APPARATUS WITH REVERSE OSMOSIS MEMBRANE

Masaaki Imai, Nishinomiya, and Minoru Uemura, Itami, both of Japan, assignors to Sasakura Engineering Co., Ltd., Osaka, Japan

Filed Jul. 10, 1989, Ser. No. 377,882
Claims priority, application Japan, Jul. 11, 1988, 63-173172
Int. Cl.[5] B01D *13/00, 31/00*
U.S. Cl. 210—101 **1 Claim**



1. Reverse osmosis apparatus comprising:

a reciprocating pump means including a first cylinder chamber and a second cylinder chamber, which is smaller in volume than said first chamber and has a piston rod extending through said second cylinder chamber,

feed conduit means connected to said first cylinder chamber for feeding fluid thereto through a first one-way flow means for fluid flow thereto,

a reverse osmosis membrane module including an inlet and outlet to collect permeate fluid,

a second one-way flow means connecting said first cylinder chamber with said reverse osmosis membrane module inlet for fluid flow to said inlet, and

a selector connecting said second cylinder chamber with said reverse osmosis membrane module outlet,

a drain conduit means connected to said selector for draining concentrated fluid from said second cylinder chamber,

said selector having a first position where said reverse osmosis membrane module outlet and said second cylinder chamber communicate together and said drain conduit means is isolated, and a second position where said outlet is blocked and said second cylinder chamber and said drain conduit means communicate together,

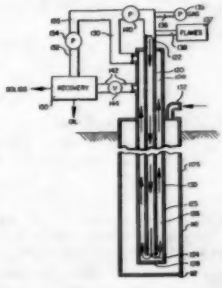
means for continuous pump operation including means for enabling said selector to be connected in pressure communication with said cylinder chambers to shift to said first position when the pressure in said first cylinder chamber increases, and to said second position when the pressure in said second cylinder chamber increases.

4,929,348

APPARATUS FOR CARRYING OUT EXTRACTIONS IN SUBTERRANEAN WELL

Wayne K. Rice, P.O. Box 9, Wanatah, Ind. 46390, assignor to Wayne K. Rice, Wanatah, Ind.

Division of Ser. No. 74,091, Jul. 16, 1987, Pat. No. 4,810,373, which is a division of Ser. No. 732,362, May 8, 1985, Pat. No. 4,683,063. This application Mar. 6, 1989, Ser. No. 320,214
Int. Cl.[5] B01D *11/04*
U.S. Cl. 210—109 **12 Claims**



1. An apparatus for carrying out a co-current solvent extraction using as the solvent a liquefiable fluid, which apparatus comprises:

a long, small-diameter, vertical cylinder extraction vessel;

a vertical pipe concentrically disposed within said extraction vessel extending downwardly from the top of said extraction vessel to near the bottom of said extraction vessel, said pipe defining an annular opening within said extraction vessel;

means to continuously charge said fluid at a pressure of at least about 2,000 psi; into the top of said extraction vessel to fill said extraction vessel;

means to circulate said pressurized fluid through said extraction vessel;

means to charge a material to be extracted into the circulating fluid within said extraction vessel, whereby said charged material is mixed with said fluid and the resulting

mixture is carried to the bottom of said extraction vessel where the pressure head formed by the mixture of said charged fluid and said charged material increases the total pressure at the bottom of said extraction vessel, to a pressure selected to provide solubility of selected components of said material to be extracted in said fluid, means to continuously circulate said fluid through said extraction vessel to cause the charged material to be extracted to move upwardly to the top of the extraction vessel; and

recovery means located near the top of said extraction vessel constructed to separate solids from fluids having a pressure of at least about 2,000 psi, said recovery means comprising a porous membrane means for receiving a portion said mixture from said extraction vessel, said membrane constructed to allow passage of fluid from said mixture, but not solids; said membrane positioned within a pressure jacket; said recovery means having apertures to permit the flow of fluid from said extraction vessel through said membrane to said pressure jacket; and

control means to regulate the pressure within said jacket to control the rate of flow of said fluid through said membrane.

4,929,349

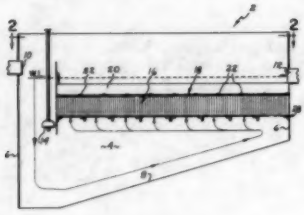
BIO-FILTRATION APPARATUS AND METHOD FOR WASTEWATER TREATMENT

William J. Beckman, 842 Ohio Pike, Cincinnati, Ohio 45245

Filed Aug. 24, 1988, Ser. No. 236,515

Int. Cl.[5] C02F *3/06*

U.S. Cl. 210—151 **5 Claims**



1. In a sewage treatment apparatus having a treatment tank into which effluent to be treated is introduced and then exits said tank after treatment, the improvement comprising, in combination,

wedge wire panels mounted horizontally in said tank, and

a fixed film media reactor mounted directly below said wedge wire panels, said media reactor having a plurality of vertical channels therethrough which form a surface for the growth of aerobic microorganisms, and

means for introducing effluent into said tank and causing said effluent to pass upwardly through said vertical channels and then through said wedge wire panels

wherein said wedge wire panels and fixed film media reactor are constructed and arranged to establish laminar flow throughout the fixed film media reactor.

4,929,350

ROTARY SCREW FISH COLLECTOR

Mark G. Wade, 1005 SE. Park, Corvallis, Oreg. 97330, and Kenneth R. Kenaston, P.O. Box 991, Philomath, Oreg. 97370

Continuation-in-part of Ser. No. 256,589, Oct. 12, 1988, abandoned. This application Aug. 2, 1989, Ser. No. 395,731

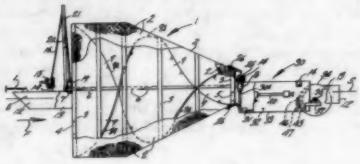
Int. Cl.[5] B01D *33/02, 35/02*

U.S. Cl. 210—157 **20 Claims**

1. A fish and debris collector for use in a body of water, said collector comprising,

a support structure including bearing means, and

a porous structure including a screen of frustoconical shape, said screen having an inlet end opening and an outlet end opening the latter being lesser size than said inlet end opening, shaft means journalled in said bearing means, a tapered screw blade located interiorly of said screen and having an outer edge attached to said screen, said screw blade submersible in the body of water,



said screw blade comprising means for rotating

said porous structure by water acting on said screw blade whereby submerged spaced apart segments of the screw blade in conjunction with the screen effect a traveling enclosure for the fish for the transfer of same and water borne debris to the outlet opening of the structure.

4,929,351

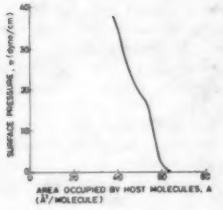
PORTABLE ULTRA-FILTRATION SYSTEM

George W. Sanborn, Walpole, Mass., assignor to Sanborn, Inc., Wrentham, Mass.

Continuation of Ser. No. 256,749, Oct. 12, 1988, abandoned. This application May 26, 1989, Ser. No. 357,685

Int. Cl.[5] B01D *61/18*

U.S. Cl. 210—195.2 **14 Claims**



1. A portable ultra-filtration system for filtering waste fluid contained in a storage drum, comprising:

A. a base member having a periphery formed to engage the upper rim of the drum;

B. a panel positioned on a front portion of the base member, the panel having a fluid inlet port, a permeate outlet port, and a compressed air port disposed therein;

C. a compressed-air-operated pump located behind the front panel;

D. means for enabling the pump to draw fluid from the drum;

E. a prefilter housing containing a cartridge prefilter arranged to receive the outflow of the pump;

F. an ultra-filter containing a membrane ultra-filter, the ultra-filter housing having a permeate outlet and a concentrate outlet;

G. a rigid conduit for mechanically coupling an outlet of the prefilter housing to an inlet of the ultra-filter housing;

H. support means for supporting the rigid conduit so that the prefilter and ultra-filter are maintained in vertical orientation;

I. means for maintaining the pressure of fluid flowing through the ultra-filter; and

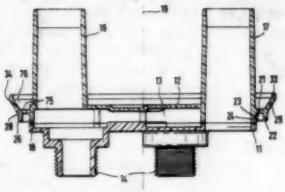
J. means for directing the fluid from the concentrate outlet of the ultra-filter to the drum.

4,929,352

DEVICE FOR FILTERS, INSERT FOR FILTERS AND FILTER

Joachim Wolf, Malmsheimer Str. 67, 7252 Weil der Stadt, Fed. Rep. of Germany

Filed May 16, 1988, Ser. No. 194,480
Int. Cl.[5] B01D *27/08, 35/02*
U.S. Cl. 210—232 **14 Claims**



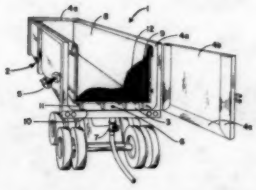
1. A filter insert including a filter device, which device has an underside and a top side and comprises:
a circular adapter,
a circular head,
said adapter and circular head having a common outer periphery,
a sealing device in the area radially outside of said outer periphery,
said head and said adapter being firmly and integrally connected together at adjacent surfaces thereof that are positioned inward relative to said sealing device to contain
said distribution compartment fluid-tight between said head and said adapter, and
a solid annular collar extending radially outside of said outer periphery and having an underside with a conical outer surface and forming part of said sealing device,
said insert comprising filter cartridges hanging from said underside of said device within a flexible bag below a top region of said bag, which top region is secured in a fluid-tight manner on said conical outer surface of said collar.

4,929,353

PORTABLE LIQUID-SOLID SEPARATOR FOR BULK SLUDGE

Ronald B. Harris, 28191 Range Rd., Livingston, La. 70754

Filed Feb. 6, 1989, Ser. No. 306,700
Int. Cl.[5] B01D *35/30*
U.S. Cl. 210—237 **8 Claims**



1. A portable liquid-solid separator for sludge, comprising:
(a) an upright trailer having a bed and surrounding sides, said bed having a drain;
(b) a first grate overlaying said bed;
(c) a first means to support said first grate in a position to allow said liquid to flow through said grate to said drain;
(d) a second grate extending upright from said bed;
(e) a second means to support said second grate in a position to create a gap between said second grate and one of said sides of said trailer; and
(f) a filter inducing capillary attraction between said filter and said liquid, said filter overlaying said first grate and said second grate, and said filter overlapping a top edge of said second grate and extending into said gap.

4,929,354

FILTER ELEMENT HAVING MICROPOROUS MEMBRANE

Mark T. Meyering, Middlefield, and Eugene A. Ostreicher, Farmington, both of Conn., assignors to Cuno, Incorporated, Menden, Conn.

Continuation of Ser. No. 102,314, Sep. 25, 1987, abandoned, which is a continuation of Ser. No. 758,934, Jul. 25, 1985, abandoned, which is a division of Ser. No. 700,784, Feb. 12, 1985, Pat. No. 4,579,698. This application Apr. 17, 1989, Ser. No. 339,922
Int. Cl.[5] B01D *13/00*
U.S. Cl. 210—321.61 **18 Claims**

1. A filter cartridge for filtration of aqueous liquids comprising:
(a) an end cap having hydrophobic thermoplastic sealing material therein;
(b) a hydrophilic microporous membrane in sheet form having a microporous filtering surface and nonporous crushed border surface with substantially closed micropores;
(c) the nonporous border surface partially inserted and thermoplastically sealed within the hydrophobic thermoplastic sealing material of the end cap, wherein no portion of the microporous filtering surface contacts the hydrophobic thermoplastic sealing material.

4,929,355

METHOD AND APPARATUS FOR THE SEPARATION OF CAUSTIC LIQUOR, LIME SLUDGE AND SLUDGE IN A CAUSTICIZING PROCESS

Samuel Ragnegård, and Arne Sjöberg, both of Hedemora, Sweden, assignors to AB Hedemora Verkstäder, Hedemora, Sweden

Continuation of Ser. No. 858,763, May 2, 1986, abandoned. This application Feb. 8, 1988, Ser. No. 154,459
Claims priority, application Sweden, Feb. 5, 1985, 85021236
The portion of the term of this patent subsequent to Sep. 22, 2004, has been disclaimed.
Int. Cl.[5] B01D *33/08*
U.S. Cl. 210—784 **10 Claims**

1. Apparatus for operating in a continuous causticizing process for separating either white liquor from lime sludge or green liquor from sludge under positive pressure, said apparatus comprising:
a pressure vessel;
rotatable filter element means arranged in the pressure vessel

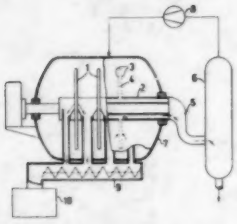
so as to pass for each revolution through a filtering cycle having filtering zones in a liquid phase and a gaseous phase;

means for removing filter cake formed on said filter element means during filtering;

means for discharging removed filter cake from the pressure vessel;

a common outlet means for discharging a mixture of filtrate and gaseous medium from the pressure vessel;

means outside of the pressure vessel and connected to said means for discharging the mixture of filtrate and gaseous medium for separating the filtrate and the gaseous medium from each other;



first outlet means for discharging the filtrate from said separating means;

second outlet means for discharging the gaseous medium from said separating means;

conduit means connecting said gaseous medium outlet means to the interior space of the pressure vessel between the inner surface of the pressure vessel and the outer surface of said filter element means; and

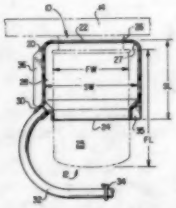
means arranged between said separating means and the pressure vessel and connected to said conduit means for increasing the pressure of the gaseous medium before conducting the gaseous medium back to the pressure vessel through said conduit means.

4,929,356

ENVIRONMENT PROTECTOR FOR REPLACEABLE CARTRIDGE FILTERS

John A. Todd, Berlin, Md., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed May 31, 1988, Ser. No. 200,396
Int. Cl.[5] B01D *27/00*
U.S. Cl. 210—248 **5 Claims**



1. A self-sealing cover for an in-line fuel filter, comprising:

an elastomeric sleeve dimensioned to fit over a canister assembly;

said sleeve having flexible first and second open ends to allow said sleeve to slidably fit over said canister assembly and form a liquid tight seal therebetween;

said sleeve and canister assembly cooperating to form a chamber therebetween for containment of spilled fuel;

means for removing said spilled fuel from said canister assembly without allowing said spilled fuel to contaminate the environment; and

said means including a hole extending through said sleeve into said chamber and located adjacent the second open end of said sleeve and a flexible tube connected with said hole to allow drainage of spilled fuel from said chamber into a separate container.

4,929,357

ISOCYANURATE CROSSLINKED POLYURETHANE MEMBRANES AND THEIR USE FOR THE SEPARATION OF AROMATICS FROM NON-AROMATICS

Robert C. Schucker, Baton Rouge, La., assignor to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Aug. 9, 1989, Ser. No. 391,058
Int. Cl.[5] B01D *13/00*
U.S. Cl. 210—640 **3 Claims**

1. A method comprising separating aromatic hydrocarbons from mixtures of same with non-aromatic hydrocarbons by contacting the mixture with one side of a non-porous isocyanurate crosslinked polyurethane membrane under conditions such that the aromatic hydrocarbon selectively permeates through the membrane.

4,929,358

POLYURETHANE-IMIDE MEMBRANES AND THEIR USE FOR THE SEPARATION OF AROMATICS FROM NON-AROMATICS

Bernd A. Koenitzer, Clearwater, Canada, assignor to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Aug. 9, 1989, Ser. No. 391,068
Int. Cl.[5] B01D *13/00*
U.S. Cl. 210—640 **10 Claims**

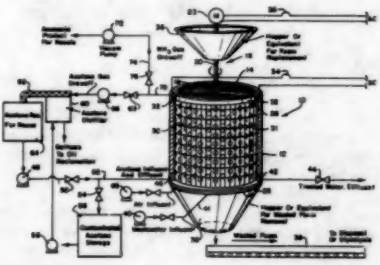
1. A method for separating aromatic hydrocarbons from a mixture containing said aromatic hydrocarbons in combination with non-aromatic hydrocarbons, the method comprising contacting said mixture under appropriate separation conditions with a membrane comprising a polyurethane-imide membrane to thereby selectively permeate the aromatic hydrocarbon through the membrane.

4,929,359

TREATMENT OF CONCENTRATED INDUSTRIAL WASTEWATERS ORIGINATING FROM OIL SHALE AND THE LIKE BY ELECTROLYSIS POLYURETHANE FOAM INTERACTION

Joan E. Tiernan, Novato, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jan. 26, 1988, Ser. No. 148,721
Int. Cl.[5] C02F *1/28, 1/46*
U.S. Cl. 210—663 **19 Claims**



1. A method of removing pollutants from concentrated synthetic fuel wastewater comprising:

mixing open-celled polyurethane foam shapes with said wastewater in a container,

applying an electric current through the wastewater, and

producing laminar flow conditions of said wastewater through said foam shapes.

4,929,360

USE OF LAMINATES CONTAINING SUPERABSORBENT POLYMERS FOR ASBESTOS ABATEMENT

Thomas J. Bohnert, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Jul. 19, 1989, Ser. No. 381,896

Int. Cl.[5] B08B *1/00*

U.S. Cl. 210—679 **1 Claim**

1. A method which comprises immobilizing water which contains asbestos fibers by incorporating aqueous-fluid absorbing polymer in a vehicle for holding aqueous-fluid absorbing polymer, exposing the vehicle to water containing asbestos fibers, wherein the aqueous-fluid absorbing polymer absorbs the water containing asbestos fibers.

4,929,361

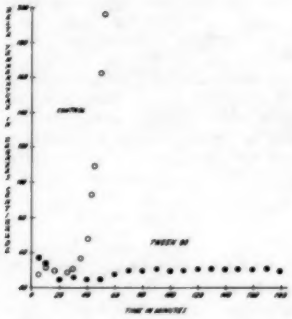
METHOD OF INHIBITING FOULING IN PROTEIN-CONTAINING FLUIDS

David M. Polizzotti, Yardley, Pa., assignor to Betz Laboratories, Inc., Trevose, Pa.

Filed May 25, 1989, Ser. No. 357,145

Int. Cl.[5] C02F *5/10*

U.S. Cl. 210—698 **8 Claims**



1. A process for controlling organic fouling of heat transfer surfaces exposed to an aqueous, acidic proteinaceous solution which comprises adding to said solution an effective inhibiting amount of a nonionic surfactant.

4,929,362

CALCIUM PHOSPHATE SCALE CONTROL METHODS

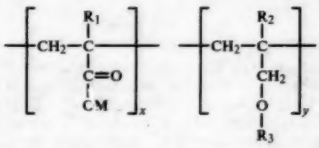
Fu Chen, Newtown, Pa., assignor to Betz Laboratories, Inc., Trevose, Pa.

Division of Ser. No. 201,645, Jun. 1, 1988, abandoned, which is a continuation of Ser. No. 944,160, Dec. 18, 1986, abandoned, which is a continuation-in-part of Ser. No. 37,484, Apr. 13, 1987, Pat. No. 4,759,851, which is a continuation of Ser. No. 864,049, May 16, 1986, Pat. No. 4,659,481, which is a continuation of Ser. No. 545,563, Oct. 26, 1983, abandoned. This application May 2, 1989, Ser. No. 346,103

Int. Cl.[5] C02F *5/10*

U.S. Cl. 210—701 **4 Claims**

1. Method of inhibiting calcium phosphate deposition on the metallic parts in contact with an aqueous medium, comprising adding to said system from 0.1 to 500 parts per million, based on one million parts of said aqueous medium, of an effective water soluble, polymeric calcium phosphate scale control agent, wherein the repeat units of said water soluble calcium phosphate scale control agent have the structure



wherein R_1 and R_2 are H, R_3 is 2-hydroxypropyl, M is a cation or H, wherein the number average molecular weight of said polymeric calcium phosphate scale control agent is within the range of 1,500 to 10,000 and wherein the molar ratio x:y of said repeat units is within the range of about 6.2:1 to 3.2:1.

4,929,363

METHOD FOR FILTERING A FLUID

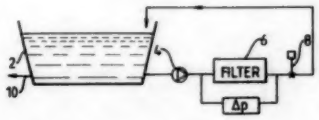
Ytzhak Barzuza, Petach Tikva, Israel, assignor to Filtration L.T.D., Herzlia, Israel

Filed Feb. 19, 1988, Ser. No. 157,873

Claims priority, application Israel, Feb. 27, 1987, 81713

Int. Cl.[5] B01D *37/04*

U.S. Cl. 210—741 **10 Claims**



1. A method for filtering a fluid in a filter system, including a filter housing and a filter element, comprising the step of:

modifying filter throughput in such a way that differential pressure across said filter system caused by build-up of filter cake is substantially maintained at a predeterminable level for at least part of filter-operation time between flushings.

4,929,364

AMINE/GALLIC ACID BLENDS AS OXYGEN SCAVENGERS

Patricia A. Reardon, Downers Grove, and David A. Grattan, La Grange Highlands, both of Ill., assignors to Nalco Chemical Company, Naperville, Ill.

Continuation of Ser. No. 64,161, Jun. 19, 1987, abandoned. This application Nov. 4, 1988, Ser. No. 268,661

Int. Cl.[5] C02F *1/20*

U.S. Cl. 210—750 **4 Claims**

1. A method for scavenging dissolved oxygen from waters used to generate steam which comprises treating said waters with at least 0.5 mole of propyl gallate per mole of oxygen contained in said boiler water using an aqueous concentrate containing at least 0.3 weight percent propyl gallate, said aqueous concentrate having a pH of at least 8.5, said pH having been adjusted by a water-soluble neutralizing amine of the type used to treat boiler waters said neutralizing amine being present in sufficient amount to solubilize said propyl gallate in said waters used to generate steam.

4,929,365

BIOFILM CONTROL

James B. Clark, and Deborah E. Langley, both of Bartlesville, Okla., assignors to Phillips Petroleum Co., Bartlesville, Okla.

Filed Sep. 18, 1989, Ser. No. 408,851
Int. Cl.[5] C02F 1/76
U.S. Cl. 210—754 9 Claims

1. A method for the removal of biofilms composed of microorganisms from a submerged surface in an aqueous medium comprising contacting said biofilm with

(i) an aqueous stabilized chlorine dioxide; followed by;

(ii) at least one nutrient source; wherein said nutrient source is provided in an effective amount to result in the microorganisms in the biofilm generating one or more acidic compounds and said aqueous stabilized chlorine dioxide is provided in an amount sufficient, when activated, by said one or more acidic compounds generated by said microorganisms to kill a sufficient number of the microorganisms in the biofilm to result in the removal of said biofilm from said submerged surface.

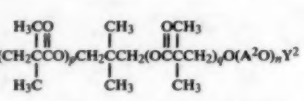
4,929,366

FINISH COMPOSITIONS FOR SYNTHETIC YARNS

Hisao Yamamoto, and Atsushi Nakamura, both of Aichi, Japan, assignors to Takemoto Yushi Kabushiki Kaisha, Aichi, Japan

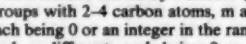
Filed Dec. 20, 1988, Ser. No. 287,426
Claims priority, application Japan, Jan. 9, 1988, 63-2752
Int. Cl.[5] D06M 1/00
U.S. Cl. 252—8.6 15 Claims

1. A finish composition for synthetic yarns, said composition comprising 10–80 wt % of a lubricant including a compound shown by Formula (1) given below and 10–60 wt % of a surfactant:



(1)

where Y^1 and Y^2 are monocarboxylic acid residues shown by Formula (2) or Formula (3) given below, at least one of Y^1 and Y^2 being monocarboxylic acid residue shown by Formula (2), A^1 and A^2 are alkylene groups with 2–4 carbon atoms, m and n are same or different, each being 0 or an integer in the range of 1–10, p and q are equal or different, each being 0 or an integer in the range of 1–4 such that (p+q) is an integer in the range of 1–4:



(2)

wherein R^1 is alkyl group or alkenyl group with 6–22 carbon atoms and r is an integer in the range of 1–3, and

(3)

where R^2 is alkyl or alkenyl group with 7–25 carbon atoms.

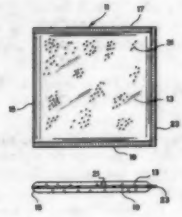
4,929,367

ANTISTATIC AND FABRIC SOFTENING LAUNDRY WASH CYCLE ADDITIVE COMPOSITION IN FILTERING POUCH

James M. Thomas, Woodbridge, and Ronald D. Kern, Buttzville, both of N.J., assignors to Colgate-Palmolive Co., Piscataway, N.J.

Filed Oct. 6, 1986, Ser. No. 916,069
Int. Cl.[5] D06M 13/34, 13/46
U.S. Cl. 252—8.8 19 Claims

1. An antistatic and fabric softening laundry wash cycle additive article which comprises an antistatic and fabric softening composition in a filtering container, which composition comprises a complex of a cationic surfactant and an anionic surfactant, in which complex the molar proportion of the anionic surfactant is at least equimolar with respect to that of the cationic surfactant, or a mixture of cationic surfactant and anionic surfactant in which mixture the proportion of the anionic surfactant is at least equimolar with respect to that of the cationic surfactant, which complex or mixture is in a filtering container which is a non-woven pouch of fibrous material having wall openings which prevent passage therethrough of



particles larger than 250 microns, when the container and its contents are added to wash water in an automatic washing machine, filters materials passing through it so that cationic-/anionic surfactant complex passing through walls of the container is of a small enough size so that it does not form greasy deposits on laundry being washed.

4,929,368

FLUOROETHER GREASE ACOUSTIC COUPLANT

Joseph Baumoel, 155 Plant Ave., Hauppauge, N.Y. 11788

Filed Jul. 7, 1989, Ser. No. 376,529
Int. Cl.[5] C10M 107/38
U.S. Cl. 252—11 5 Claims

1. In combination; an ultrasonic transducer, a conduit for carrying fluid which is at a temperature in excess of 500° F., a clamping structure for clamping a surface of said transducer to the exterior surface of said conduit, and a sonic coupling fluid disposed between said surface of said transducer and said exterior surface; said coupling fluid comprising a fluoroether grease.

4,929,369

GREASE COMPOSITION

Bernard Tury, Prestwich, England, assignor to Imperial Chemical Industries PLC, London, United Kingdom

Filed Oct. 5, 1989, Ser. No. 417,335
Claims priority, application United Kingdom, Oct. 26, 1988, 8825073
Int. Cl.[5] C10M 129/50
U.S. Cl. 252—12 15 Claims

1. A composition which comprises

(a) a salt of a monovalent metal (M) of a carboxylic acid in which the carboxylic acid group is attached to a ring atom of a fused ring system; and

(b) a grease which is a non-soap thickened mineral or synthetic oil.

4,929,370

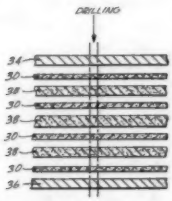
DRY LUBRICANT DRILLING OF THRU-HOLES IN PRINTED CIRCUIT BOARDS

William R. Hatch, Diamond Bar, Calif., and John W. Foster, Edina, Minn., assignors to Lubra Sheet Corporation, Eden Prairie, Minn.

Continuation of Ser. No. 227,687, Sep. 30, 1988, abandoned, which is a division of Ser. No. 919,085, Oct. 14, 1986, Pat. No. 4,781,495. This application Aug. 1, 1989, Ser. No. 390,496
Int. Cl.[5] B23B 51/06, 35/00
U.S. Cl. 252—12.2 10 Claims

1. A dry film lubricating sheet for use in a drilling process for

lubricating a rotary drilling tool during the process of drilling a thru-hole in a printed circuit board in a dry state so that drill life is extended and the thru-holes are cleanly formed by preventing dielectric smear on the face of a metal layer through which the thru-hole is drilled, the lubricating sheet comprising a porous carrier sheet, and a lubricating material impregnated in and coating at least one surface of the carrier sheet in thin film form, the lubricating material comprising a mixture of a water soluble hardener comprising a principal component of the lubricating material, and a water soluble lubricant, combined to form a water soluble and substantially dry lubricating film in solid film form on the surface of the carrier sheet, so the film-coated carrier sheet comprises a separate lubricating sheet which can be overlaid on and removed from the surface of the printed circuit board, in which the lubricating film on the carrier sheet is in a film thickness sufficient to transfer lubricating properties to a rotary drill penetrating the overlaid carrier sheet, and in which the melting temperature of the dry film is lower than the drill tool temperature during normal use to liquify the film to transfer its lubricating properties from the lubricating sheet to the rotary drill.



4,929,371

STEEL MILL GREASE

John A. Waynick, Bolingbrook, Ill., assignor to Amoco Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 77,607, Jul. 24, 1987, Pat. No. 4,830,767, which is a continuation-in-part of Ser. No. 830,710, Feb. 18, 1986, abandoned. This application Mar. 31, 1989, Ser. No. 332,523

Int. Cl.[5] C05M *117/00;* **C10M** *125/10, 125/24*

U.S. Cl. 252—25 **19 Claims**

1. A grease, comprising:

a substantial proportion of a base oil;

a thickener comprising a member selected from the group consisting of biurea, triurea, and polyurea;

extreme pressure wear-resistant additives in the absence of sulfur-containing compounds for imparting extreme pressure properties to said lubricating grease, said additives comprising at least one member selected from the group consisting of a phosphate of a Group 1a alkali metal, a phosphate of a Group 2a alkaline earth metal, a carbonate of a Group 1a alkali metal, and a carbonate of a Group 2a alkaline earth metal;

said alkaline earth metal being selected from the group consisting of beryllium, magnesium, calcium, strontium, and barium;

said alkali metal being selected from the group consisting of lithium, sodium, potassium, rubidium, cesium, and francium; and

a water-resistant hydrophobic polymeric additive in the absence of polyester, said additive being different than said base oil.

4,929,372

LUBRICATING OIL COMPOSITIONS FOR CHAINS

Hideo Akanuma, Tokyo; Masashi Murata, Funabashi; Kiyoshi Inoue, Hiratsuka, and Ryoji Ohgake, Yachimata, all of Japan, assignors to Asahi Glass Co., Ltd. and Nippon Oil Co., Ltd., both of Tokyo, Japan, a part interest

Filed May 23, 1989, Ser. No. 356,795

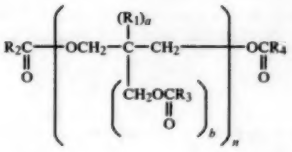
Claims priority, application Japan, May 26, 1988, 63-127172

Int. Cl.[5] C10M *125/02*

U.S. Cl. 252—29 **6 Claims**

1. A lubricating oil composition for chains which consists essentially of

(A) as the base oil, a polyol ester represented by the general formula



wherein R_1 is an alkyl group having 1 to 4 carbon atoms, R_2 to R_4 are each an alkyl group having 2 to 17 carbon atoms, a and b are each an integer of 0 to 2 with the proviso that the total of a and b is 2, and n is an integer of 1 to 4, and

(B) as an additive, a graphite fluoride represented by the formula

CF_x

wherein x is a number of 0.5 to 1.2, in an amount of 0.5 to 30% by weight based on the total amount of the composition.

4,929,373

PROCESS FOR PREPARING OVERBASED CALCIUM SULFONATES

William J. Powers, III; Leonard A. Matthews, both of Port Arthur, Tex., and Tze-Chi Jao, Fishkill, N.Y., assignors to Texaco Inc., White Plains, N.Y.

Filed Oct. 10, 1989, Ser. No. 419,558

Int. Cl.[5] C10M *135/10*

U.S. Cl. 252—33 **8 Claims**

1. A process for preparing an overbased oil-soluble calcium sulfonate, comprising:

(a) diluting a neutral calcium sulfonate with a light hydrocarbon solvent and a lower alkanol;

(b) adding water, calcium oxide and about 15 to 25 mole % of the total calcium hydroxide;

(c) heating the resulting admixture to about 100° F. to 155° F. at pressure of about 1 to 5 atm;

(d) introducing carbon dioxide into the heated admixture over a time of about 60 to 240 minutes while adding the remaining calcium hydroxide in amounts whereby the molar ratio of carbon dioxide to the sum of calcium hydroxide and calcium oxide is in the range of 0.65 to 0.90,

(e) adding a diluent oil;

(f) separating solids from the liquid; and

(g) stripping the solvent and alcohol from the resulting liquid product.

4,929,374

LUBRICATING OIL COMPOSITION

Feike De Jong; Willem Dannenberg, and Jacob Vermeule, all of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Aug. 8, 1988, Ser. No. 229,202

Claims priority, application United Kingdom, Sep. 22, 1987, 8722323

Int. Cl.[5] C10M *133/16*

U.S. Cl. 252—39 16 Claims

1. A lubricating oil composition comprising a lubricating base oil, an overbased alkaline earth metal salt of an alkyl salicyclic acid in which the alkyl group has at least 8 carbon atoms, a succinimide derivative being the reaction product of a hydrocarbyl-substituted succinic anhydride and an amine, and an anti-gelling agent of an alkanolamine derivative.

14. A lubricating oil concentrate comprising a lubricating base oil, up to 80 w% of an overbased metal alkyl salicylate in which the alkyl gorup has at least 8 carbon atoms, up to 60 w% of a succinimide derivative being the reaction product of a hydrocarbyl-substituted succinic anhydride and an imine and from 0.5 to 10 w% of an anti-gelling agent of an alkanolamine derivative, all of weight percentages being based on the weight of the lubicating base oil.

4,929,375

CONVEYOR LUBRICANT CONTAINING ALKYL AMINE COUPLING AGENTS

Charles E. Rossio, Carleton, and Wladyslaw W. Koziol, Ann Arbor, both of Mich., assignors to Diversey Corporation, Ontario, Canada

Filed Jul. 14, 1988, Ser. No. 218,893

Int. Cl.[5] C10M *173/02*

U.S. Cl. 252—49.3 22 Claims

1. An aqueous conveyor lubricant composition concentrate consisting essentially of:

(a) a carrier selected from the group consisting of water, alkanols, a polyhydric alcohol; and mixtures thereof; and

(b) a first solubilizing agent consisting essentially of an alkyl tertiary amine having between 8 and 10 carbon atoms; and

(c) a fatty acid selected from the group consisting of C12 to C22 saturated and unsaturated carboxylic acids and mixtures thereof;

(d) a second solubilizing agent selected from the group consisting of alkyl aryl sulfonates; and

(e) a harness sequestering agent.

4,929,376

QUATERNARY AMMONIUM SALT OF AN ALKOXYSILANE AS A DISPERSANT FOR MAGNETIC PIGMENT

Gary A. Vincent; Judith M. Sylvester, and Harold L. Vincent, all of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Mar. 23, 1988, Ser. No. 171,613

Int. Cl.[5] C04B *35/26*

U.S. Cl. 252—62.56 1 Claim

1. A composition comprising:

(A) from about 1 to 8 parts by weight of a quaternary ammonium salt of an alkoxysilane having the formula

$$n\text{-}C_{18}H_{37}\overset{+}{N}(CH_3)_2\text{—}CH_2CH_2CH_2\text{—}Si(OMe)_3 \quad X^-$$

wherein Me denotes the methyl radical and X is a hydrolyzable group selected from the group consisting of chloride, bromide, iodide, acetate, and methoxide;

(B) 100 parts by weight of a magnetic pigment; and

(C) a phosphate ester dispersant.

4,929,377

STABLE, AQUEOUS BLEACH COMPOSITIONS CONTAINING SOLID ORGANIC PEROXY ACID

Stuart A. Emmons, Tremeirchion, and Perry Hale, Wallasey, both of Great Britain, assignors to Lever Brothers Company, New York, N.Y.

Filed Feb. 21, 1989, Ser. No. 313,408

Claims priority, application United Kingdom, Mar. 1, 1988, 8806704

Int. Cl.[5] C11D *1/14, 3/39*

U.S. Cl. 251—100 9 Claims

1. An aqueous, liquid, bleach composition having a pH of from about 2 to about 6 and a viscosity of from about 0.05 to about 1.0 PaS, measured at a shear rate of 21 second^{-1} at 20° C., comprising:

(a) from 1.5 to 20% by weight of a solid, particulate, substantially water-insoluble, organic peroxy acid;

(b) from 2.0 to 20% by weight of a surfactant mixture consisting of a secondary C_{10}–C_{20} alkane sulphonate (SAS) and an ethoxylated fatty alcohol (NI) having a Hydrophilic-Lipophilic Balance (HLB) of not more than 10.5 in a weight ratio of from 5:5 to 9:1; and

(c) from 7 to 16% by weight of sodium sulphate.

4,929,378

BATH PREPARATION

Yasuhiko Morita, Kyoto; Yoshitomi Kakiguchi, Osaka, and Seiji Izuhara, Tondabayashi, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 63,916, Jun. 19, 1987, abandoned. This application May 10, 1989, Ser. No. 352,680

Claims priority, application Japan, Jul. 3, 1986, 61-156697

Int. Cl.[5] C11D *7/32;* D06L *3/10*

U.S. Cl. 252—105 3 Claims

1. In a bath preparation the combination of

(a) at least one member selected from the group consisting of ascorbic acid, sodium ascorbate, and calcium ascorbate, and

(b) at least one reducing agent selected from the group consisting of sodium dithionite, potassium dithionite, L-cysteine hydrochloride, glutathione and propyl gallate,

the proportion of component (b) to component (a) being 0.02 to 2 parts by weight.

4,929,379

PARTICULATE DETERGENT COMPOSITION

Willem Oldenburg, Vlaardingen; Simon N. Hemmes, Bilthoven, and Jaap E. Hobbel, De Meern, all of Netherlands, assignors to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 727,201, Apr. 29, 1985, abandoned, which is a continuation of Ser. No. 572,045, Jan. 19, 1984, abandoned. This application Jun. 10, 1988, Ser. No. 206,906

Claims priority, application United Kingdom, Jan. 20, 1983, 8301503; May 27, 1983, 8314839

Int. Cl.[5] C11D *9/14, 17/08*

U.S. Cl. 252—109 14 Claims

1. A particulate detergent composition with improved stock solution behaviour comprising:

(a) from 5 to 40% by weight of a detergent active system which consists essentially of

1. up to 75% by weight of a water-soluble fatty acid soap component having a Krafft-temperature of below 30° C., said component constituting at least 5% of the detergent composition; and

2. an alkoxylated alcohol nonionic component having an HLB-value of between 12 and 16;

(b) from 20 to 70% by weight of an alkaline buffering agent such that a 1% solution of said composition has a pH of above 11.5; and

(c) up to 40% by weight of a detergency builder selected from the group consisting of sodium, potassium, ammonium, and substituted ammonium pyrophosphates, -tri-

polyphosphates, -ethylene diamine tetracetates, -nitrilotriacetates, -etherpolycarboxylates, -citrates, -carbonates, -orthophosphates, -carboxymethyloxysuccinates, and mixtures thereof; and water;

wherein an aqueous stock solution at 10% concentration of said detergent composition exhibits substantially no gelation, phase separation or turbidity at 20° C.

4,929,380

PROCESS FOR THE PREPARATION OF A STORAGE-STABLE LIQUID DETERGENT COMPOSITION

Paul Schulz, Wuppertal; Karl Schwadtke, Leverkusen, and Eduard Smulders, Hilden, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft aug Aktien, Duesseldorf, Fed. Rep. of Germany

Division of Ser. No. 67,518, Jun. 26, 1987, abandoned. This application Oct. 19, 1988, Ser. No. 262,204

Claims priority, application Fed. Rep. of Germany, Jun. 27, 1986, 3621536

Int. Cl.[5] C11D *11/00, 1/83*

U.S. Cl. 252—121 **17 Claims**

1. A process for producing a detergent having a liquid surfactant component comprising

(a) a non-ionic surfactant selected from the group consisting of adducts of a C_{10}–C_{20}-fatty alcohol with from 2 to 8 moles ethylene oxide per mole fatty alcohol;

(b) an anionic surfactant selected from the group consisting of surface active soaps, sulfates, sulfonates, and mixtures thereof; and

(c) polyethylene glycol having a molecular weight of from about 200 to 600; and a particulate solids component comprising

(d) a first finely divided fraction having an average particle size of from about 0.01 to 30 microns; and

(e) a second more coarsely divided fraction having an average particle size of from about 200 to 2000 microns;

wherein the particulate solids component includes at least one member selected from the group consisting of a builder, a redeposition inhibitor, an optical brightener, a detergency-promoting enzyme, a bleach, a bleach activator, and a foam inhibitor; said process comprising

(f) admixing the liquid components of the detergent including the liquid surfactant component with the solid components of the detergent which do not substantially chemically interact with each other or with the liquid components to form a suspension;

(g) wet grinding the suspension to reduce the particle size of the solid components to an average particle size of 30 microns or less to provide a ground suspension;

(h) admixing the ground suspension with the second coarsely divided solids fraction; and

(i) degassing the mixture.

4,929,381

INORGANIC ANION EXCHANGERS AND PREPARATION THEREOF

Howard W. Clark, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 876,603, Jun. 20, 1986, abandoned, which is a continuation-in-part of Ser. No. 748,274, Jun. 24, 1985, abandoned. This application Mar. 1, 1988, Ser. No. 162,714

The portion of the term of this patent subsequent to Sep. 6, 2005, has been disclaimed.

Int. Cl.[5] C11D *3/14*

U.S. Cl. 252—174.25 **29 Claims**

1. An anion exchanger material comprising a substantially crystalline material exhibiting anion exchange properties represented by the formula

$$[M^{a}]_{1-x}Q_{x}^{a+1}(OH)_{2}](A^{-1})_{b}d$$
$$d(A^{-2})_{c}(A^{-3})_{f}(A^{-4})_{g}nH_{2}O$$

where M is a metal element or elements each with a positive valence of a; Q is a metal element or elements each with a positive valence of a+1; a is 2, 3, 4, or 5; A^{-1}, A^{-2}, A^{-3}, and A^{-4} are each one or more exchangeable anions each having a negative valence of 1, 2, 3, and 4, respectively; x is $0<x\leqq 0.5$; and n, y, z, d, e, f and g are real numbers greater than or equal to zero and satisfy the following:

$$2y+z=a;\ y<z$$

$$0<d+2e+3f+4g\leqq x$$

$$0\leqq n\leqq 10$$

provided that when y=0, a is not equal to 2.

4,929,382

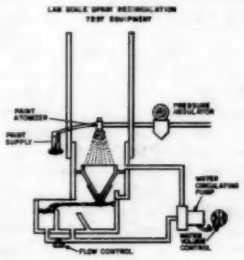
CATIONIC COAGULANTS PLUS COLLOIDAL SILICA FOR USE IN PAINT DETACKIFICATION

Claudia V. Stenger, and Shu-Jen W. Huang, both of Naperville, Ill., assignors to Nalco Chemical Company, Naperville, Ill.

Continuation-in-part of Ser. No. 226,595, Aug. 1, 1988, Pat. No. 4,863,615. This application Mar. 3, 1989, Ser. No. 318,308

Int. Cl.[5] C02F *1/56*

U.S. Cl. 252—181 **2 Claims**



1. A composition useful in detackifying paint contained in the circulating waters which collects surplus paint from a paint spray booth which comprises:

(A) A water soluble cationic polymeric coagulant formed by the reaction of epichlorohydrin, dimethylamine, and ammonia, and having a molecular weight less than 100,000, and;

(B) An aqueous colloidal silica sol having an average particle size between about 1–150 nm,

with the ratio of A to B being from 1/5 to 5/1 on an actives basis.

4,929,383

STABLE EMULSTIFIED BLEACHING COMPOSITIONS

Blanca L. Haendler, Livermore, Calif., assignor to The Clorox Company, Oakland, Calif.

Continuation-in-part of Ser. No. 840,974, Mar. 13, 1986, abandoned, which is a continuation of Ser. No. 574,565, Jan. 27, 1984, abandoned. This application Oct. 20, 1986, Ser. No. 921,236

Int. Cl.[5] A01N *59/08*

U.S. Cl. 252—187.26 **10 Claims**

1. A method of preparing a liquid composition useful for treating fabrics comprising:

providing a quantity of an oxidized polyethylene, a polyethylene-acrylic acid copolymer, or a mixture thereof;

subjecting the polymer in the presence of water to turbulent jet interaction sufficient to form a latex in which a lipophilic phase thereof is formed of polymer droplets having an average diameter of submicron size;

admixing a quantity of substantially water insoluble discrete particles suitable for treating fabrics into the latex; and

slowly admixing an aqueous bleaching solution into the latex until the polymer droplets form a lipophilic reticulum in which the discrete particles are entrapped.

4,929,384

PROCESS FOR IMPROVING THE LUMINESCENCE OF NIOBIUM ACTIVATED YTTRIUM TANTALATE X-RAY PHOSPHOR

Vaddi B. Reddy, Sayre, Pa., assignor to GTE Products Corporation, Stamford, Conn.

Filed Jun. 7, 1989, Ser. No. 362,717

Int. Cl.[5] C09K *11/78*

U.S. Cl. 252—301.4 R **1 Claim**

1. A process for preparing M'YTaO$_4$:Nb X-ray phosphor, said process comprising:

(a) forming a uniform mixture consisting essentially of Y_2O_3, Ta_2O_5, and Nb_2O_5 components, and a flux selected from the group consisting of lithium chloride, lithium sulfate and a mix of lithium sulfate and potassium sulfate the mole ratio of lithium sulfate to potassium sulfate in said mix being about 80 to 20, wherein said flux makes up from about 25% to about 50% by weight of said mixture, said components being provided in an amount equal to approximately the stoichiometric amounts required to form said phosphor;

(b) firing said mixture in a furnace by heating said mixture in said furnace from a temperature of about 300° C. to a temperature of from about 1200° C. to about 1300° C. at a heating rate of from about 1.0° C. per minute to about 1.5° C. per minute and maintaining said temperature for from about 10 hours to about 14 hours to react said components and produce a fired material containing luminescent material;

(c) cooling the resulting fired material by turning off the heat to said furnace and allowing said fired material to remain in said furnace until the temperature in said furnace is no higher than about 300° C.;

(d) washing the resulting cooled material with deionized water to remove essentially all of said flux therefrom and produce a washed M' niobium activated yttrium tantalate phosphor;

(e) removing the wash water from and drying said washed phosphor;

(f) classifying the resulting dried phosphor to obtain a −325 mesh particle size in said phosphor;

(g) forming a uniform mixture consisting essentially of the resulting classified phosphor and a flux selected from the group consisting of lithium chloride, lithium sulfate and a mix of lithium sulfate and potassium sulfate the mole ratio of lithium sulfate to potassium sulfate in said mix being about 80 to 20, wherein said flux makes up from about 10% to about 50% by weight off said phosphor-flux mixture;

(h) firing said phosphor-flux mixture in a furnace by heating said phosphor-flux mixture in said furnace from a temperature of about 300° C. to a temperature of from about 1100° C. to about 1300° C. at a heating rate of from about 1.0° C. per minute to about 1.5° C. per minute and maintaining said temperature for from about 2 hours to about 10 hours to produce a fired material containing the re-fired phosphor;

(i) cooling said fired material containing said re-fired phosphor by turning off the heat to said furnace and allowing said fired material containing said re-fired phosphor to remain in said furnace until the temperature in said furnace is no higher than about 300° C.;

(j) washing the resulting cooled material containing said re-fired phosphor with deionized water to remove essentially all of said flux therefrom and produce a washed re-fired M' niobium activated yttrium tantalate phosphor;

(k) removing the wash water from and drying said washed re-fired phosphor; and

(l) classifying the resulting dried re-fired phosphor to obtain a −325 mesh particle size in said re-fired phosphor, said re-fired phosphor having a higher luminescence intensity than the phosphor obtained in step (f).

4,929,385

FREON FREE PROCESS FOR PREPARING A NIOBIUM ACTIVATED YTTRIUM TANTALATE X-RAY PHOSPHOR

Vaddi B. Reddy, Sayre, Pa., assignor to GTE Products Corporation, Stamford, Conn.

Filed Jun. 7, 1989, Ser. No. 362,720

Int. Cl.[5] C09K *11/78*

U.S. Cl. 252—301.4 R **2 Claims**

1. A process for preparing M' YTaO$_4$:Nb X-ray phosphor, said process comprising:

(a) forming a uniform first mixture consisting essentially of Y_2O_3, Ta_2O_5, and Nb_2O_5 components, said components being provided in an amount equal to approximately the stoichiometric amounts required to form said phosphor;

(b) milling said first mixture with deionized water;

(c) removing said water from the resulting milled first mixture;

(d) forming a uniform second mixture consisting essentially of said first mixture and a flux, said flux selected from the group consisting of lithium sulfate, lithium chloride and a mix of lithium sulfate and potassium sulfate wherein the mole ratio of lithium sulfate to potassium sulfate in said mix is about 80 to 20, said flux making up from about 25% to about 50% by weight of said second mixture;

(e) firing said second mixture in a furnace by heating said mixture in said furnace from a temperature below about 300° C. to a temperature of from about 1200° C. to about 1300° C. at a heating rate of from about 1.0° C./minute to about 1.5° C. per minute and maintaining said temperature for from about 10 hours to about 14 hours to react said components and produce a fired material containing luminescent material;

(f) cooling the resulting fired material by turning off the heat to said furnace and allowing said fired material to remain in said furnace until the temperature in said furnace is no higher than about 300° C.;

(g) washing the resulting cooled material with deionized water to remove essentially all of said flux therefrom and produce a washed M' niobium activated yttrium tantalate phosphor;

(h) removing the wash water from and drying said washed phosphor; and

(i) classifying the resulting dried phosphor to obtain a −325 mesh particle size in said phosphor,.

4,929,386

PROCESS FOR PREPARING A NIOBIUM ACTIVATED YTTRIUM TANTALATE X-RAY PHOSPHOR

Vaddi B. Reddy, Sayre, Pa., assignor to GTE Products Corporation, Stamford, Conn.

Filed Jun. 7, 1989, Ser. No. 362,721

Int. Cl.[5] C09K *11/78*

U.S. Cl. 252—301.4 R **4 Claims**

1. A process for preparing a single phase M'YTaO$_4$:Nb X-ray phosphor, said process comprising:

(a) forming a uniform mixture consisting essentially of Y_2O_3, Ta_2O_5, and Nb_2O_5 components, and a flux consisting essentially of lithium sulfate and potassium sulfate in a mole ratio of lithium sulfate to potassium sulfate of about 80 to 20, wherein said flux makes up from about 25% to about 50% by weight of said mixture, said components being provided in an amount equal to approximately the stoichiometric amounts required to form said phosphor;

(b) milling said mixture with a milling fluid in which said components and flux are insoluble;
(c) removing said milling fluid from the resulting milled mixture;
(d) firing said milled mixture in a furnace by heating said mixture in said furnace from a temperature below about 300° C. to a temperature of from about 1200° C. to about 1300° C. at a heating rate of from about 1.0° C. per minute to about 1.5° C. per minute and maintaining said temperature for from about 10 hours to about 14 hours to react said components and produce a fired material containing luminescent material;
(e) cooling the resulting fired material by turning off the heat to said furnace and allowing said fired material to remain in said furnace until the temperature in said furnace is no higher than about 300° C.;
(f) washing the resulting cooled material with deionized water to remove essentially all of said flux therefrom and produce a washed single phase M' niobium activated yttrium tantalate phosphor;
(g) removing the wash water from and drying said washed phosphor; and
(h) classifying the resulting dried phosphor to obtain a −325 mesh particle size in said phosphor, said phosphor being essentially free of Y_3TaO_7 phase.

4,929,387

PHOSPHATE GLASS USEFUL IN HIGH POWER LASERS

Joseph S. Hayden, South Abington Township, Lackawana County; David L. Sapak, Avoca, and Julia M. Ward, Hollidaysburg, all of Pa., assignors to Schott Glass Technologies, Inc., Duryea, Pa.

Continuation-in-part of Ser. No. 238,437, Aug. 31, 1988, abandoned. This application Apr. 3, 1989, Ser. No. 331,782

Int. Cl.[5] C03C *3/16, 3/19, 3/17, 3/062*

U.S. Cl. 252—301.4 P **23 Claims**

1. A low- or no-silica phosphate glass useful as a laser medium and having a high thermal conductivity, $K_{90° C.}$ >0.8 W/mK, and a low coefficient of thermal expansion, $\alpha_{20°-40° C.}$ <80×10^{-7}/°C., consisting essentially of (on a batch composition basis):

	Mole %
P_2O_5	45–70
Li_2O	15–35
Na_2O	0–10
Al_2O_3	10–15
K_2O	0–3
Iasable ion	0.01–6
La_2O_3	0–6
SiO_2	0–8
B_2O_3	0–8
MgO	0–18
CaO	0–15
SrO	0–9
Bao	0–9
ZnO	0–15

the amounts of Li_2O and Na_2O providing an average alkali metal ionic radius sufficiently low whereby said glass has $K_{90° C.}$ >0.8 W/mK and $\alpha_{20°-40° C.}$ <80×10^{-7}/°C., and wherein, when the batch composition is melted in contact with a silica-containing surface, the final glass composition contains at most about 3.5 mole % of additional silica derived from such contact during melting.

4,929,388

ANTISTATIC OR ELECTRICALLY SEMICONDUCTING THERMOPLASTIC POLYMER BLENDS, METHOD OF MAKING SAME AND THEIR USE

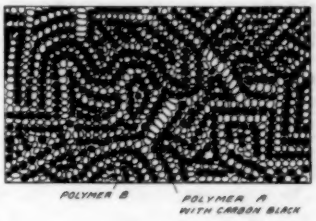
Bernhard M. Wessling, Tremsbuttel, Fed. Rep. of Germany, assignor to Zipperling Kessler & Co. (GmbH & Co.), Ahrensburg, Fed. Rep. of Germany

Filed Nov. 5, 1985, Ser. No. 795,250

Claims priority, application Fed. Rep. of Germany, Nov. 7, 1984, 3440617

Int. Cl.[5] H01B *1/06*

U.S. Cl. 252—500 **15 Claims**



1. Antistatic or electrically semiconducting thermoplastic polymer blends based on organic polymers and electrically conductive substances, said polymer blends containing two partially compatible thermoplastic polymers A and B, wherein polymer A at a given temperature has a lower melt viscosity than polymer B, wherein there is a solubility parameter difference between polymer A and polymer B of approximately 0.3 to 1.5 $(cal/cm^3)^{\frac{1}{2}}$, wherein the weight ratio of polymer A:polymer B is ≦1:1, wherein polymer A forms the continuous phase essentially containing the electrically conductive substances, wherein said polymer blends contain conductive substances in a quantity of 0.5 to 30% by weight, based on the polymer blend, and said conductive substances are selected from the group consisting of metal powders or fibers, carbon fibers, conductive carbon black with a BET-surface>250 m^2/g and a dibutyl phthalate absorption>140 $cm^3/100$ g, electrically conductive doped organic polymers, non-polymeric organic conductors, and mixtures thereof.

4,929,389

WATER-SOLUBLE CONDUCTIVE POLYMERS

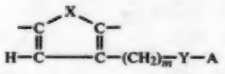
Mahmoud Aldissi, Sante Fe, N. Mex., assignor to The United States of America as represented by the Department of Energy, Washington, D.C.

Filed Feb. 12, 1988, Ser. No. 155,450

Int. Cl.[5] H01B *1/00*

U.S. Cl. 252—500 **9 Claims**

1. An electrically conductive self-doped polymeric composition of matter having a monomer repeat unit comprising:



where the monomer-to-monomer bonds of said polymer are located between the carbon atoms adjacent to X;
where X is chosen from a group consistng of NH and S;
where m is a whole number having a value of from 1 to 20, inclusive;
where Y is chosen from a group consisting of SO_3, SO_4, and CO_2; and
where A is chosen from a group consisting of hydrogen, lithium, sodium, potassium, rubidium, and cesium.

4,929,390

CONDUCTIVE COMPOSITION AND METHOD OF USE

Delbert E. Sayles, Sr., Omaha, Nebr., assignor to Sayles & Scheel Enterprises, Incorporated, Council Bluffs, Iowa

Filed Jul. 12, 1988, Ser. No. 218,543

The portion of the term of this patent subsequent to Jul. 14, 2004, has been disclaimed.

Int. Cl.[5] H01B *1/06*

U.S. Cl. 252—510 **14 Claims**

1. A conductive composition comprising electrically conductive metal, butyl acetate, toluene, and carbon.

4,929,391

ELECTRICALLY CONDUCTIVE SILICON COMPOSITIONS

Loretta N. Kroupa, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Jul. 20, 1988, Ser. No. 221,841

Int. Cl.[5] H01B *7/06*

U.S. Cl. 252—511 **8 Claims**

1. An electrically conductive composition comprising polydiorganosiloxane and conductive carbon particles, wherein the improvement comprises adding from 6 to 30 parts by weight per 100 parts of the carbon particles of conductivity improver comprising disilazane of the formula $(R_3Si)_2NH$ where R is a substituted or unsubstituted alkyl radical of from 1 to 6 carbon atoms.

4,929,392

INCLUSION COMPLEXES PROVIDING SECOND HARMONIC GENERATION

John E. Trend, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Sep. 11, 1985, Ser. No. 774,941

Int. Cl.[5] G02B *5/20*; G02F *1/01*

U.S. Cl. 252—582 **5 Claims**

1. A non-centrosy m metric inclusion complex comprising:

a non-centrosy m metric host material wherein said host material is selected from the group consisting of amyloses and cyclodextrins, and

a guest material wherein said guest material is selected from the group consisting of 5-nitroindoline and 4-(N,N-dimethylamino)-benzylidene-2-hydroxyaniline

wherein said guest material is entrapped within the molecular structure of said host material or entrapped between two or more adjacent molecules of said host material, said complex having a non-zero second order molecular hyperpolarizability, said complex further exhibiting greater second harmonic generation efficiency than either said host material or said guest material exhibits alone.

4,929,393

1,4-DISUBSTITUTED-2,3,5,6-TETRAHYDROXY-1,4-DIPHOSPHORINANES AND THEIR OXIDES OR SULFIDES

Allan J. Robertson, Ontario, Canada, and James B. Gallivan, Norwalk, Conn., assignors to Cyanamid Canada Inc., Willowdale, Canada

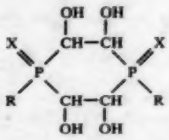
Division of Ser. No. 309,572, Feb. 13, 1989, Pat. No. 4,855,507. This application May 22, 1989, Ser. No. 409,919

Claims priority, application Canada, Mar. 28, 1988, 562688

Int. Cl.[5] B03D *1/02*; C08K *5/53*

U.S. Cl. 252—609 **7 Claims**

1. A composition of matter comprising a polymeric material containing a flame-retarding amount of the compound having the formula:



wherein R is a substituted or unsubstituted C_1–C_{12} alkyl, C_5–C_7 cycloalkyl, C_8–C_{12} aralkyl or C_6–C_{12} aryl radical and X is oxygen or sulfuer.

4,929,394

PROCESS FOR COMPACTING RADIOACTIVE METAL WASTES

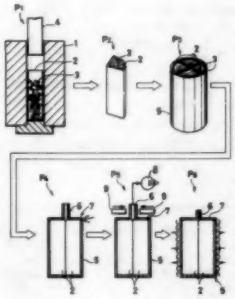
Kazuo Kitagawa; Fumiaki Komatsu, both of Kobe; Takayoshi Masaki, Akashi; Yoshihisa Sawada, Nishinomiya, and Eiichi Inada, Ibaraki, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe and Doryokuro Kakunenryo Kaihatsu Jigyodan, Tokyo, both of, Japan

Filed Jan. 31, 1989, Ser. No. 304,218

Claims priority, application Japan, Feb. 1, 1988, 63-22208

Int. Cl.[5] G21F *9/12, 9/24, 9/16*

U.S. Cl. 252—633 **13 Claims**



1. A process for compacting radioactive metal waste comprising the steps of:

filling the waste into a plurality of capsules, each of said capsules being positioned in a die during said filling step;

precompressing only the waste in each of said capsules during said filling step, whereby said capsules are not compressed, wherein each of said capsules is filled with the waste in a compressed state and each of said capsules have a cross sectional form corresponding to a divided segment of the cross section of an HIP treatment container;

placing said capsules into an HIP treatment container;

filling the HIP treatment container with a metal powder serving as a filler; and

sealing the HIP treatment container and subjecting said HIP treatment container to an HIP treatment in its entirety.

4,929,395
16α-METHYLATION PROCESS

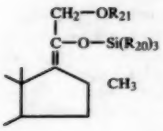
Verlan H. VanRheenen, Portage, and Joel E. Huber, Kalamazoo, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 724,380, Apr. 18, 1985, Pat. No. 4,704,455, which is a continuation-in-part of Ser. No. 618,986, Jun. 11, 1984, abandoned. This application Nov. 14, 1986, Ser. No. 930,830

Int. Cl.[5] C07J *1/00*; A61K *31/56*

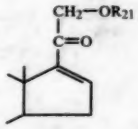
U.S. Cl. 540—4 **19 Claims**

1. A process for the preparation of a $\Delta^{17(20)}$-steroid of the formula



(II)

which comprises starting with a 16-unsaturated corticoid of the formula



(I)

and

(1) contacting the 16-unsaturated corticoid (I) with a methylating agent in the presence of a copper catalyst and

(2) contacting the product of step (1)with a silylating agent

where

R_{20} is alkyl of 1 thru 4 carbon atoms or phenyl, the R_{20}'s can be can be the same or different;

R_{21} is a hydrogen atom, -CO-R_{21}, or -Si(R_{121})3;

R_{21}' is alkyl of 1 thru 4 carbon atoms or phenyl;

R_{121} is alkyl of 1 thru 4 carbon atoms or phenyl, the R_{121}'s can be the same or different.

4,929,396
PRODUCTION OF HEXAMETHYLENEDIAMINE MUCONATE SALT

Sol J. Barer, Fanwood; Peter C. Maxwell, New Providence, and Jih-Han Hsieh, Parsippany, all of N.J., assignors to Celgene Corporation, Warren, N.J.

Division of Ser. No. 457,808, Jan. 13, 1983, Pat. No. 4,725,542. This application Oct. 17, 1984, Ser. No. 661,705

Int. Cl.[5] C07C *87/14*

U.S. Cl. 562—595 **3 Claims**

1. Hexamethylenediamine muconate salt.

4,929,397
APPARATUS FOR AERATING WATER

Andreas Jäger, Burgdorf, Fed. Rep. of Germany, assignor to Arnold Jäger, Burgdorf, Fed. Rep. of Germany

Filed Mar. 30, 1989, Ser. No. 331,470

Claims priority, application Fed. Rep. of Germany, Mar. 30, 1988, 3810790

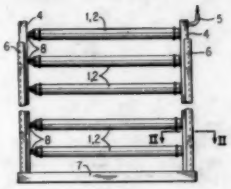
Int. Cl.[5] B01F *3/04*

U.S. Cl. 261—65 **12 Claims**

1. An apparatus for aerating water, comprising:

rigid supporting pipes that serve to receive air and are provided with first opening means for the discharge of air; and

respective covers closely disposed on said supporting pipes for receiving air from said first opening means thereof, with said covers being provided with second opening means in the form of slits that are resiliently expandable in response to air received from said supporting pipes, whereby said supporting pipes and said covers together are disposed in an essentially vertical plane, with respective supporting pipes, with their covers, being horizontally disposed above and parallel to one another, and with



at least one of said first and second opening means having throughput capacities such that when viewed from the bottom to the top, said throughput capacities become progressively smaller, so that in the case of a common air supply means for all of said supporting pipes and covers of said apparatus, at least essentially identical air throughputs are assured at the different vertical levels of said supporting pipes and their covers.

4,929,398
TOWER PACKING CARTRIDGE

George C. Pedersen, Box 570846, Perrine, Fla. 33157

Filed Mar. 29, 1989, Ser. No. 330,223

Int. Cl.[5] B01F *3/04*

U.S. Cl. 261—94 **10 Claims**

1. A cartridge of tower packing material, for installation in an axially elongated processing tower having flow passage means, which comprises

(a) a plurality of strip-like sections of high bulk, high void fraction filamentary fabric-like material,

(b) said strip-like sections being arranged in face-to-face contact, and being assembled in sufficient number and of such length as to form a cartridge of predetermined cross section for close reception in a flow passage of said processing tower,

(c) said fabric-like material being of a waffle-weave construction comprising a first set of generally parallel strands extending in substantially straight fashion in one predetermined direction and a second set of strands extending at right angles to said predetermined direction,

(d) each repeating group of strands of said first set being arranged in a generally saw-tooth cross sectional configuration whereby the thickness of said fabric-like material is substantially equal to the height of said saw-tooth cross sectional configuration,

(e) each repeating group of strands of said second set being arranged in a generally saw-tooth cross sectional configuration intersecting at right angles with the strands of said first set,

(f) the intersecting strands of saw-tooth configuration forming a substantially non-nestable waffle-weave construction, whereby a plurality of layers of the material may be assembled in face-to-face contact without significant reduction in the void fraction of the assembled layers in relation to the individual layers, and providing a void fraction of the assembled, contacting layers of at least about 80%,

(g) said strip-like sections being set on edge in said cartridge, with said strands lying generally in planes parallel to the general direction of fluid flow through the passage in which said cartridge is installed.

4,929,399

STRUCTURED COLUMN PACKING WITH LIQUID HOLDUP

Michael J. Lockett, and Richard A. Victor, both of Grand Island, N.Y., assignors to Union Carbide Industrial Gases Technology Inc., Danbury, Conn.

Continuation of Ser. No. 169,592, Mar. 17, 1988, abandoned. This application Oct. 12, 1989, Ser. No. 420,825

Int. Cl.[5] B01F *3/04*

U.S. Cl. 261—112.2 **12 Claims**

1. A column packing element comprising a corrugated sheet having a top and a bottom and a plurality of flutes laterally disposed on said sheet, each said flute comprising an elevation with respect to said sheet, the elevation disposed at an angle to said sheet, said elevation angle being 90 degrees or less with respect to an axis from said top to said bottom thereby forming a shelf along the sheet sufficient to cause liquid flowing down the packing element to form a pool on said shelf.

4,929,400

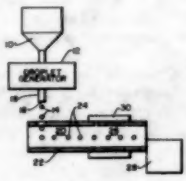
PRODUCTION OF MONODISPERSE, POLYMERIC MICROSPHERES

Alan Rembaum; Won-Kyu Rhim, both of Pasadena; Michael T. Hyson, Glendale, and Manchium Chang, Los Angeles, all of Calif., assignors to California Institute of Technology, Pasadena, Calif.

Filed Apr. 28, 1986, Ser. No. 856,201

Int. Cl.[5] B28B *9/10*

U.S. Cl. 264—10 **14 Claims**



1. A method of forming uniformly sized, small, spherical, polymeric particles having a diameter from 100 Angstroms to 100 microns varying no more than plus or minus 5 percent from the average diameter without use of a catalyst comprising repeating the steps of:

deploying a spheroidal droplet consisting essentially of a radiation polymerizable, unsaturated liquid monomer and absent catalyst or surfactant into a zone consisting of inert gas;

levitating the droplet while in the zone;

applying polymerization inducing radiation to the spherical droplet while in the zone and polymerizing the droplet throughout its volume to form a solid spherical particle; and

recovering the solid particle.

14. A method of forming uniformly-sized, spherical polymeric particles comprising repeating the steps of:

deploying a spheroidal droplet consisting essentially of radiation-polymerizable, unsaturated liquid monomer into a zone containing inert gas;

levitating the droplet while in the zone;

solidifying the droplet into a solid, spheroid droplet while in the zone by lowering the temperature of the liquid droplet below its melting point; and

then polymerizing the solid droplet by applying polymerizing inducing radiation to the solid droplet to form a polymerized solid particle.

4,929,401

METHOD OF MAKING A REUSABLE ADHESIVE PRODUCT

Mark A. Shippen, 108 St. Francis Pl., Prattville, Ala. 36067

Filed Jan. 26, 1989, Ser. No. 301,968

Int. Cl.[5] B29C *35/18, 43/20;* **B32B** *25/08*

U.S. Cl. 264—22 **7 Claims**

1. A method of preparing a reusable adhesive product comprising

(a) applying a room-temperature vulcanizing rubber composition onto a substrate; (b) applying a molding release film onto said rubber composition; and (c) pressing out a thin film coating of the rubber composition with a mechanical device.

4,929,402

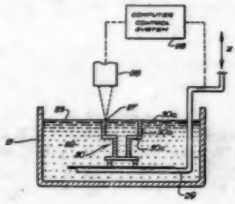
METHOD FOR PRODUCTION OF THREE-DIMENSIONAL OBJECTS BY STEREOLITHOGRAPHY

Charles W. Hull, Arcadia, Calif., assignor to 3D Systems, Inc., Valencia, Calif.

Continuation of Ser. No. 161,346, Feb. 19, 1988, abandoned, which is a continuation of Ser. No. 792,979, Dec. 9, 1985, abandoned, which is a division of Ser. No. 638,905, Aug. 8, 1984, Pat. No. 4,575,330. This application Apr. 19, 1989, Ser. No. 340,894

Int. Cl.[5] G03B *35/00;* **B29C** *67/24*

U.S. Cl. 264—22 **34 Claims**



1. A method for producing a three-dimensional object from a medium capable of solidification when subjected to prescribed radiation, said method comprising:

containing a body of said medium capable of solidification;

drawing upon and forming successive cross-sectional laminae of said object at a two-dimensional interface of said medium defining a designated working surface, said lami-

nae including a first cross-sectional layer of structure at said working surface;

automatically coating over the entire said first cross-sectional layer of structure with a body of said medium and decreasing a substantial portion of said body of medium in thickness from a layer of excess fluid thickness to a successive layer of less thickness in preparation for formation of a second cross-sectional layer of structure adhered to said first cross-sectional layer; and

moving said cross-sectional layers as they are formed and building up said object from a plurality of successively adhered layers of structure in stepwise fashion, whereby a three-dimensional object is extracted from a substantially two-dimensional surface.

4,929,403

PROCESS FOR FORMING MULTI-LAYER FLEXIBLE MOLDS

Edwin F. Audsley, c/o Chem-Form, Inc., 18 W. Windermere Ter., Landsdowne, Pa. 19050

Filed Jul. 25, 1989, Ser. No. 385,007

Int. Cl.[5] B29C *35/08, 41/22*

U.S. Cl. 264—22 **21 Claims**

1. A process for rapidly forming a multilayer flexible mold for finely detailed objects from a radiatively curable molding composition, the process comprising:

(a) coating at least a portion of the surface of a three-dimensional object with a fluid molding composition, the molding composition being radiatively curable;

(b) curing the coating to form an elastic, flexible layer of cured molding composition on the three-dimensional object by exposing the fluid coating composition to radiative energy;

(c) repeating steps (a) and (b) successively until a self-supporting multilayer elastic coating of cured molding composition has been formed on the three-dimensional object, the multilayer coating being sufficiently strong so as to not distort perceptibly when filled with a molding material having a low to moderate density; and

(d) removing the three-dimensional object.

4,929,404

GRAPHITIC OR CARBONACEOUS MOLDINGS AND PROCESSES FOR PRODUCING THE SAME

Kunimasa Takahashi, Ichikawa; Takashi Kameda, Ami, and Haruo Shibatani, Sakura, all of Japan, assignors to Mitsubishi Petrochemical Company Limited, Tokyo, Japan

Continuation of Ser. No. 779,590, Sep. 24, 1985, abandoned. This application May 17, 1988, Ser. No. 196,760

Claims priority, application Japan, Sep. 25, 1984, 59-199737; Dec. 3, 1984, 59-255270; Mar. 29, 1985, 60-63329; Apr. 23, 1985, 60-87264

Int. Cl.[5] C10C *3/00;* **B29C** *43/52*

U.S. Cl. 264—29.5 **31 Claims**

1. A process for producing a carbonaceous or graphitic composite molding comprising a filler of at least one material in powder form selected from the group consisting of graphitic carbon, carbonaceous carbon, metals, metal compounds and other inorganic compounds qualified as a filler to a carbonaceous or graphitic molding derived from a mesophase-containing pitch, which comprises the four steps of:

(1) suspending a filler comprising at least one material in powder form selected from the group consisting of graphitic carbon, carbonaceous carbon, metals, and metal compounds or other inorganic compounds qualified as a filler to a carbonaceous or graphitic molding in a tar containing a mesophase pitch precursor;

(2) heating said suspension system to evaporate the light distillates contained in the tar by blowing of an inert gas into the suspension or by subjecting the suspension to a reduced pressure and subjecting said mesophase pitch precursor to heat treatment at 350° to 500° C. to obtain a carbonaceous precursor having a mesophase-containing pitch containing 30 to 80% by weight of quinoline insolubles, 40% or more of mesophase content, an upper limit of 400° C. and a carbonization yield at 1,000° C. of at least 70% by weight;

(3) molding said carbonaceous precursor into a green molding containing mesophase-containing pitch; and

(4) providing said green molding for carbonization or graphitization reaction in an inert atmosphere to form a carbonaceous or graphitic composite.

4,929,405

ULTRATHIN POLYIMIDE POLYMER FLIMS AND THEIR PREPARATION

Rachel S. Kohn, Springfield, N.J., assignor to Hoechst Celanese Corp., Somerville, N.J.

Continuation-in-part of Ser. No. 339,903, Apr. 17, 1989, Pat. No. 4,880,699, which is a continuation of Ser. No. 267,712, Nov. 4, 1988, abandoned, which is a continuation of Ser. No. 149,824, Jan. 29, 1988, abandoned, which is a division of Ser. No. 917,731, Oct. 10, 1986, Pat. No. 4,746,474. This application May 22, 1989, Ser. No. 355,711

Int. Cl.[5] B29C *41/12*

U.S. Cl. 264—41 **29 Claims**

1. A process for preparing a pinhole-free, polyimide polymer film having a thickness of about 400 angstroms or less wherein the process comprises:

(a) preparing a casting solution containing a fluorinated polyimide polymer in 1,2,3-trichloropropane, propyl acetate or butyl acetate;

(b) depositing the casting solution on water to form a free-standing film; and

(c) removing the film from the water.

4,929,406

PROCESS FOR PRODUCING AN INORGANIC POROUS MEMBRANE

Fumio Abe, Handa; Hiroshi Mori, Nagoya, and Shigekazu Takagi, Aichi, all of Japan, assignors to NGK Insulators, Ltd., Japan

Filed May 26, 1989, Ser. No. 357,268

Claims priority, application Japan, May 27, 1988, 63-130827; May 27, 1988, 63-130828; May 31, 1988, 63-133771

Int. Cl.[5] B01D *13/04*

U.S. Cl. 264—45.5 **3 Claims**

1. A process for the production of an inorganic porous membrane, comprising the steps of:

providing a porous support;

providing a hydrosol containing titanium hydroxide or titanium oxide, wherein a precursor forming the hydrosol is hydrolyzed under the presence of acid at a molar ratio of the precursor to water of more than 1/200 and a molar ratio of titanium compound contained in the hydrosol to water is diluted to less than 1/500;

coating at least one surface of said porous support by immersion thereof in said hydrosol, so as to form a porous thin layer on said support;

drying the hydrosol coated porous support; and

firing the hydrosol coated porous support at a temperature of about 300°–700° C.

4,929,407

PROCESS OF MAKING A GOLF BALL COVER

John Giza, Acushnet, Mass., assignor to Acushnet Company, New Bedford, Mass.

Filed Dec. 6, 1988, Ser. No. 280,565

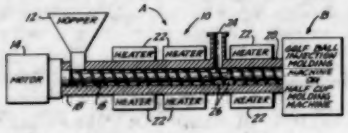
Int. Cl.[5] B29C *33/10, 43/56, 45/63*

U.S. Cl. 264—101 **18 Claims**

1. In a method for forming a golf ball cover from an ionomeric resin cover stock comprising an ionomeric resin of a copolymer of an olefin and an alpha, beta ethylenically unsaturated carboxylic acid with 10–90% of the carboxylic groups being neutralized by metal ions by subjecting said ionomeric

resin cover stock to heating, venting and forming into a golf ball cover, the improvement comprising:

(a) heating said ionomeric resin cover stock to form a melted ionomeric resin cover stock; and



(b) flashing said melted ionomeric resin cover stock at a temperature above about 400° F. (204° C.) in a vented barrel to release moisture from said melted ionomeric resin cover stock thereby reducing the moisture of said melted ionomeric resin cover stock to below about 900 ppm.

4,929,408

METHOD OF LOCATING AN ELECTRICAL CONDUCTOR BETWEEN A FIRST EXTRUDED TUBE AND AN EXTRUDED LINING

Bernhard Lodder, Baalderesch 29, 7772 EW Hardenberg; Hendrik Severiens, De Hoge Esch 55, 7783 CB Gramsbergen; Jan A. van Houten, St. Pietersland 35, 7943 EM Meppel, and Berend J. van Dijk, Prinses Marijkelaan 13, 7776 XA Slagharen, all of Netherlands

Continuation of Ser. No. 102,491, Sep. 29, 1987, abandoned. This application Apr. 14, 1989, Ser. No. 337,994

Claims priority, application Netherlands, Sep. 30, 1986, 8602469

Int. Cl.[5] B29C *47/02*

U.S. Cl. 264—149 **6 Claims**

1. A method of producing by extrusion, electroweldable fittings of thermoplastic which are provided internally with at least one electrical conductor extending helically substantially in a cylindrical plane wherein a first tube is provided on its outer side with at least one spiral groove and on its inside wall with a smooth surface, said first tube is fed to a transverse lining extruder after said at least one electrical conductor has been fitted into the spiral groove whereby a lining of thermoplastic material is applied to the outer side of the first tube in excess of the wall thickness of the first tube to form a continuously interfused tube provided with said electrical conductor located internally, and the continuously interfused tube is divided into electroweldable fittings of a desired length; wherein a first extruder in a first stage extrudes the first tube which is non-rotating and is internally sized and cooled, while said first tube is in a plastic state and non-rotating said at least one spiral groove being formed on the outer side of the first tube, introducing at least one electrical conductor into said at least one spiral groove after cooling and internal sizing of said first tube, and feeding the first tube with the electrical conductor to the lining extruder and applying the lining, the lining extruder being positioned in line with the first extruder, the speeds of the first tube from the first extruder and the continuously interfused tube from the lining extruder are adjusted to one another, the continuously interfused tube being cooling and non-rotating and the diameter and circular shape of the inside wall of the first tube are maintained in the cooled continuous non-rotated interfused tube with the electrical conductor close to the inside wall.

4,929,409

METHOD IN MANUFACTURING A HEAT INSULATED TUBE AND A DEVICE IN EXTRUDERS FOR MANUFACTURING THE TUBE

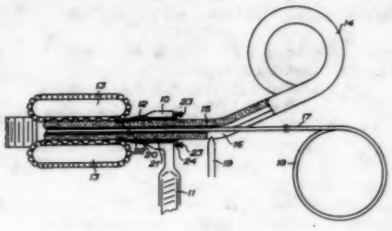
Lennart Agren, Borås, and Eino Hölsö, Viskafors, both of Sweden, assignors to Oy Uponor AB, Nastola, Finland

Continuation of Ser. No. 940,764, Dec. 19, 1986, abandoned. This application Feb. 3, 1989, Ser. No. 307,196

Claims priority, application Sweden, Dec. 3, 1985, 8501212

Int. Cl.[5] B29C *47/28*

U.S. Cl. 264—508 **10 Claims**



1. Method for manufacturing a heat insulated tube including an inner tube for conducting fluid, a heat insulating layer enclosing said inner tube, and a sheath covering the heat insulating layer, comprising the steps of:

feeding the inner tube and the insulating layer enclosing the inner tube axially through an angle extruder, extruding the sheath from the angle extruder around the heat insulating layer radially spaced therefrom,

maintaining the sheath spaced from the insulating layer when moving together with said layer and said inner tube, over an initial distance from the angle extruder, and

forming said sheath against chill molds under the influence of negative pressure downstream of said initial distance for compressing said sheath toward the insulating layer and imparting a corrugated shape to the sheath.

4. In an extruder having an angle extruder die defining a passage for prefabricated tubing having an insulating layer and overlying sheath, the improvement comprising sleeve means projecting from said angle extruder die coaxially with said passage and forming an extension of the passage at the outlet of the angle extruder die and corrugation means at the downstream end of said sleeve, said means together extruding and then corrugating the sheath onto said insulating layer, said corrugation means comprising chill molds forming said sheath under the influence of negative pressure.

4,929,410

METHOD FOR BLOW-MOLDING A CONTAINER HAVING A NECK-PORTION WITH INTERNAL ATTACHMENT MEANS

Eric W. Meyer, Brussels, Belgium, and Robert H. Van Coney, Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Dec. 6, 1984, Ser. No. 678,621

The portion of the term of this patent subsequent to Mar. 25, 2003, has been disclaimed.

Int. Cl.[5] B29C *49/30, 49/58, 49/64;* B29D *1/00*

U.S. Cl. 264—533 **7 Claims**

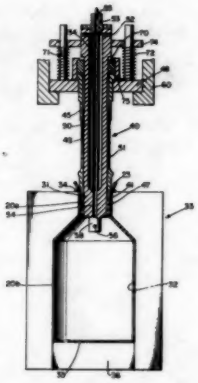
1. A method of blow-molding a thermoplastic container having a body-portion and a neck-portion provided with a dispensing orifice and internal attachment means, said method comprising the following steps:

(a) forming a hollow parison of thermoplastic material having an open end;

(b) placing said parison within a female mold cavity having a body-forming portion and a neck-forming portion such that the open end of said parison is located within said neck-forming portion of said mold cavity;

(c) inserting an expandable core pin into the open end of said parison, said core pin having relieved areas formed on its exterior surfaces and including blowing means connected to a pressure source;

(d) introducing means within said corepin and thereby expanding said core pin such that said open end of said parison is forced against the neck-forming portion of said mold cavity and into the relieved areas on the exterior of said core pin, thereby forming said internal attachment



means on the inner surface of the open end of said parison, and such that a seal is created by said parison between said corepin and said neck-forming portion of said mold cavity and the entire upper end of said mold cavity is effectively sealed other than said blowing means;

(e) introducing pressure through said blowing means of said core pin to the interior of said parison thereby expanding said parison against the inner surfaces of said body-forming portion of said female mold cavity to form the body-portion of said thermoplastic container;

(f) removing said molded thermoplastic container from said female mold cavity; and

(g) collapsing said expandable core pin and, thereafter, removing said core pin from the neck portion of said thermoplastic container.

4,929,411

HEAT-SENSITIVE RECORDING MATERIAL

Toshimasa Usami, and Akihiro Shimomura, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 1, 1988, Ser. No. 278,320

Claims priority, application Japan, Dec. 1, 1987, 62-301561

The portion of the term of this patent subsequent to Apr. 11, 2006, has been disclaimed.

Int. Cl.[5] B41M *5/18*

U.S. Cl. 503—213 **8 Claims**

1. A heat-sensitive recording material which is comprised of a support having thereon at least one transparent heat-sensitive layer containing an organic base and microcapsules enclosing at least one colorless or light colored coloring material which can color by reaction with the organic base, wherein the transparent heat-sensitive layer is provided by coating a solution prepared by mixing the microcapsules with an emulsified dispersion obtained by mixing and emulsifying the organic base dissolved in an organic solvent which is slightly soluble or insoluble in water with aqueous solution, then drying the coat.

4,929,412

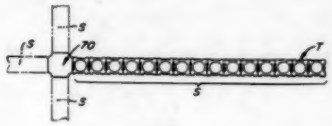
CONTROL ROD

Robert C. Dixon, Morgan Hill; James E. Cearley; Paul Van Diemen, both of San Jose; Edwin D. Sayre, Los Gatos, and Gerald M. Gordon, Soquel, all of Calif., assignors to General Electric Company, San Jose, Calif.

Division of Ser. No. 31,633, Mar. 30, 1987. This application Apr. 11, 1989, Ser. No. 336,941

Int. Cl.[5] G21C *21/18*

U.S. Cl. 376—260 **5 Claims**



1. A process for forming an elongate flat planar member comprising a portion of a nuclear reactor control rod for insertion within the core of a nuclear reactor for control of the reaction, said process comprising the steps of:

providing a plurality of tubes defining cylindrical volumes and having square cross section, each said tube defining a cylinder of constant side wall thickness sufficient for defining therewithin the cylindrical volume for the containment of neutron absorbing poisons;

providing on each said tube of said plurality of tubes four discrete right angle corner sections integrally formed to said constant side wall thickness cylinder having a placement on the outside of said cylinder at 90° intervals to the side walls of said constant side wall thickness tube, said four corner sections defining four volumes of increased thickness in said tube wall with four areas of constant thickness of said tube wall defined therebetween;

fastening said tubes in juxtaposed side-by-side relation with the two discrete right angle corner sections of one tube adjoining two discrete right angle corner sections of an adjacent tube;

joining said tubes at said corner sections in side-by-side juxtaposed relation to form said elongate planar member of said control rod;

placing neutron absorbing poisons confined within each said tube for absorption of neutrons for control of said nuclear reaction; and

plugging said tubes at the respective ends of said tubes to confine said neutron absorbing materials within said tubes.

4,929,413

TELEVISION ALIGNMENT OF MAST ASSEMBLY IN REFUELING OF NUCLEAR REACTOR

John W. Kaufmann, Murrysville; Kenneth J. Swidwa, Harmar Township, Allegheny County, and Leonard P. Hornak, North Huntingdon, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

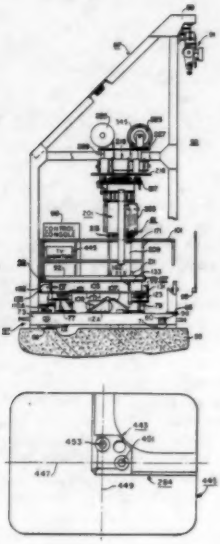
Division of Ser. No. 382,269, May 26, 1982, Pat. No. 4,832,902. This application Aug. 19, 1988, Ser. No. 234,114

Int. Cl.[5] G21C *19/10*

U.S. Cl. 376—268 **6 Claims**

6. In the refueling of a nuclear reactor having component assemblies of at least one type and being disposed in a pit in a containment under water, said refueling being carried out with a mast movable axially and circumferentially for raising and lowering said component assemblies, a mechanism, connected to an end of said mast, cooperative with said mast, for engaging a component assembly to be raised by said mast, a television camera, and a television monitor having an image-reference

indication, said mechanism being connected to said mast movable with said mast; the method of positioning said mechanism to engage said component assembly appropriately for raising and lowering, comprising: mounting said camera on said mechanism movable therewith, suspending said mast in the water of said pit with said mechanism extending from said end of said mast in said pit in position to engage said component assembly, and with said camera in a position where it picks up a view of a portion of the surface of said component assembly with



reference to which surface the mechanism is to be positioned to engage said component assembly appropriately for raising and lowering, connecting said camera to said monitor in view communication relationship to produce on said monitor an image of said portion of said surface, and while viewing said image moving said mechanism and the camera movable therewith relative to said surface to align said image with said reference indication to set said mechanism in a referenced position to be appropriate for engaging said component assembly for raising and lowering.

4,929,414

METHOD OF MANUFACTURING HEAT PIPE WICKS AND ARTERIES

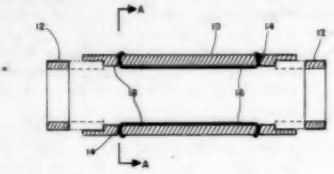
John F. Leonard, and Jerry E. Beam, both of Beavercreek, Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Oct. 24, 1988, Ser. No. 261,807
Int. Cl.[5] B22F *3/00*
U.S. Cl. 419—2 **5 Claims**

1. A method for making arteries inside a heat pipe wick comprising the steps of:

(a) securing at least one line at a preselected position generally within a volume to be occupied by the wick;

(b) fabricating the wick so that it covers the secured line; and,



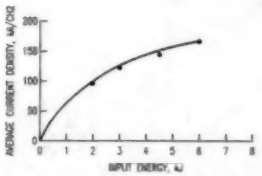
(c) heating the wick to a temperature above the decomposition temperature of the line so that the line disintegrates leaving in its place an artery through the wick.

4,929,415

METHOD OF SINTERING POWDER

Kenji Okazaki, 62 Candlewood Dr., Nicholasville, Ky. 40356

Filed Mar. 1, 1988, Ser. No. 162,591
Int. Cl.[5] B22F *1/00*
U.S. Cl. 419—52 **4 Claims**



1. A method for sintering powder, comprising applying a voltage of 3 KV or more to a mold filled with powder using an electrode which maintains a current of 50 KA cm^{-2} of greater for a period of time of 10 to 500 microseconds.

4,929,416

CAST STEEL

Vadim I. Tikhonovich, ulitsa N.Uzhvy 4V, kv. 63, Kiev; Vladimir D. Pavljuk, pereulok Parkhomenko, 8a, Asbest; Bertold B. Vinokur, ulitsa Komsomolskaya, 3, kv. 38, Kiev; Stanislav E. Kondratjuk, ulitsa L.Pervomaiskogo, 3, kv. 15, Kiev; Georgy G. Lutsenko, ulitsa Borschagovskaya, 46/1, kv. 27, Kiev; Vladimir K. Edemsky, ulitsa Ushakova, 12, kv. 156, Kiev; Vladimir B. Kiselev, ulitsa Chigorina, 49, kv. 77, Kiev; Nikolai M. Karasev, ulitsa Plekhanova, 26, and Anatoly K. Myakishev, ulitsa Mira, 4. kv. 52, both of Asbest, all of U.S.S.R.

PCT No. PCT/SU87/00092, § 371 Date Apr. 7, 1989, § 102(e) Date Apr. 7, 1989, PCT Pub. No. WO89/01987, PCT Pub. Date Mar. 9, 1989
PCT Filed Aug. 25, 1987, Ser. No. 348,495
Int. Cl.[5] C22C *38/38*
U.S. Cl. 420—12 **3 Claims**

1. A cast steel, having the composition (% by mass):

carbon	1.6–3.0
silicon	1.2–1.6
manganese	11.0–15.0
chromium	9.0–10.8
cerium	0.001–0.2
vanadium	0.15–0.3
titanium	0.05–0.3
aluminium	0.05–0.15
boron	0.005–0.015

-continued

iron	the balance.

4,929,417

METHOD OF MANUFACTURE METAL DIBORIDE CERAMICS

Tadahiko Watanabe; Kazuhisa Shobu, both of Tosu; Yukio Kai, Ohmuta; Hideki Yamamoto, Ohmuta; Eiichi Sudoh, Ohmuta; Osamu Yagishita, Ohmuta, and Junshiro Hayakawa, Higashinihonbashi, all of Japan, assignors to Agency of Industrial Science and Technology, Tokyo, Japan

Filed Apr. 21, 1989, Ser. No. 341,461
Int. Cl.[5] B22F *1/00*
U.S. Cl. 419—12 9 Claims

1. A method of manufacturing metal diboride ceramics comprising:

mixing a powder of at least one of TiB_2, ZrB_2 and HfB_2, a powder of at least one of Ti, Zr, Hf, TiB, ZrB and HfB and a powder of boron to prepare a mixed powder which can form a sintered product having a boron content of 65 to 67 atom %; and

sintering said mixed powder.

4,929,418

METHOD OF MAKING A CATHODE FROM TUNGSTEN POWDER

Louis E. Branovich, Howell; Bernard Smith, Ocean; Gerard L. Freeman, Freehold, and Eckart Donald W., Wall, all of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 22, 1990, Ser. No. 468,335
Int. Cl.[5] B22F *3/26*
U.S. Cl. 419—19 3 Claims

1. Method of making a cathode for operation in microwave devices from tungsten powder, said method including the steps of:

(A) ball milling the tungsten powder for a bout 8 hours,

(B) pressing the ball milled powder into a billet at about 48,000 psi in a die,

(C) sintering the billet at about 70° C. to 1325 ° C. for about thirty minutes in dry hydrogen of less than −100 dew-point,

(D) backfilling the billet with methyl methacrylate;

(E) machining the billet to the desired geometry,

(F) removing the methyl methacrylate by dissolution in acetone,

(G) thoroughly rinsing in deionized water, methanol and then drying,

(H) firing the billet in dry hydrogen at about 700° C. to 1325° C. for about 15 minutes,

(I) impregnating the billet with an impregnant formed from adding about 1 mole of a member selected from the group consisting of zirconium, zirconium dioxide, hafnium, hafnium dioxide, uranium, uranium dioxide, titanium, and titanium dioxide to about 50 to about 100 moles of a compound selected from the group consisting of $Ba_3Al_2O_6$, Ba_3WO_6, and $Ba_4Al_2O_7$ by firing the billet in a dry hydrogen furnace at a temperature at which the impregnant melts for about two minutes,

(J) removing the billet from the furnace after the furnace is cooled, and

(K) removing any loose pieces of impregnant from the billet.

4,929,419

HEAT, CORROSION, AND WEAR RESISTANT STEEL ALLOY AND ARTICLE

Dwight D. Wegman, Oley; Edward A. Wanner, Leesport; Wilson P. Rehrer, Reading, and Sunil Widge, Dryville, all of Pa., assignors to Carpenter Technology Corporation, Reading, Pa.

Filed Mar. 16, 1988, Ser. No. 168,924
Int. Cl.[5] C22C *38/58*
U.S. Cl. 420—56 34 Claims

1. A precipitation strengthenable, austenitic steel alloy having a good combination of high temperature strength, corrosion resistance and wear resistance, said alloy in weight percent consisting essentially of about

	w/o
Carbon	0.35–0.90
Manganese	4.5–8.5
Silicon	0.75 max.
Phosphorus	0.05 max.
Sulfur	0.015 max.
Chromium	19.0–25.0
Nickel	4.5–8.5
Molybdenum	0.5 max.
Vanadium	0.75–3.5
Boron	Up to 0.02
Nitrogen	[0.35–0.75] 1.0 max.
Tungsten	0.5 max.
Niobium	0.5 max.

and the balance essentially Iron, wherein

$C+N \leqq 0.65+0.15(\%\ V)+0.04(\%\ Mo+0.5(\%\ W))$, and

$C+N \leqq 0.65+0.38(\%\ V)+0.08(\%\ Mo+0.5(\%\ W))$, and

Ni+Mn is about 10.00–16.0 weight percent.

4,929,420

ALLOY USEFUL PARTICULARLY IN DENTISTRY

Peter Cook, Horstead, England, assignor to The National Research Development Corporation, London, England

Filed Jan. 23, 1989, Ser. No. 300,509
Claims priority, application United Kingdom, Jan. 23, 1988, 8801532
Int. Cl.[5] C22C *5/04*
U.S. Cl. 420—466 11 Claims

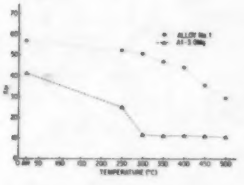
1. An alloy consisting essentially of platinum, iridium and indium, which contains from about 0.05 to about 8% by weight of indium and whose weight ratio of platinum to iridium is from about 84:15 to about 86:15.

4,929,421

ALUMINUM ALLOYS AND A METHOD OF PRODUCTION

Iljoon Jin, and David J. Lloyd, both of Kingston, Canada, assignors to Alcan International Limited, Montreal, Canada

Filed Aug. 15, 1988, Ser. No. 232,613
Claims priority, application Canada, Aug. 18, 1987, 544746
Int. Cl.[5] C22C *21/00*
U.S. Cl. 420—545 14 Claims



1. An aluminum-base alloy consisting essentially of the following: 0.4 to 1.2% by weight chromium; 0.3 to 0.8% by

weight zirconium; 1.5 to 2.5% by weight manganese; 0.01 to 2.0% by weight magnesium; balance essentially aluminum.

4,929,422

PROCESS FOR THE ADHESIVE METALLIZATION OF SYNTHETIC MATERIALS

Hartmut Mahlkow; Michael Römer; Günther Rosskamp; Hubert-Matthias Seidenspinner; Ludwig Stein, and Waltraud Strache, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

Filed Mar. 14, 1988, Ser. No. 167,832

Claims priority, application Fed. Rep. of Germany, Mar. 12, 1987, 3708214

Int. Cl.[5] B05D *5/12*

U.S. Cl. 427—57 **10 Claims**

1. In a process for adhesive metallization of synthetic material by pre-treatment of said material and subsequent activation, followed by chemical deposition, the improvement comprising the pre-treatment of said synthetic material with an alkaline solution of an oxidizing agent and then subsequently with a metal salt solution, and simultaneously with the pre-treatment applying ultrasonic waves.

4,929,423

LOW TOXICITY ALLOY COMPOSITIONS FOR JOINING AND SEALING

Kay L. Tucker, Pinner, and Ulysses Ma, London, both of England, assignors to Cookson Group plc, London, United Kingdom

Filed Mar. 31, 1989, Ser. No. 331,189

Claims priority, application United Kingdom, Mar. 31, 1988, 8807730

Int. Cl.[5] C22C *13/02*

U.S. Cl. 420—561 **11 Claims**

1. A low toxicity alloy composition for joining and sealing consisting essentially of from 0.08 to 20% by weight of bismuth, from 0.02 to 1.5% by weight of copper, from 0.01 to 1.5% by weight of silver, from 0 to 0.10% by weight of phosphorus, from 0 to 0.02% by weight of a rare earth mixture consisting of a mixture of 53% cerium, 24% lanthanum, 16% neodymium and 5% praesedymium, no more than 0.01% by weight antimony and the balance tin, together with incidental impurities.

4,929,424

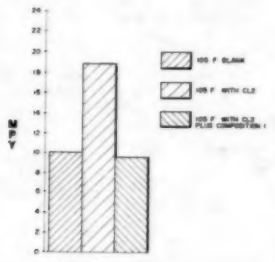
PREVENTION OF VAPOR PHASE CORROSION CAUSED BY HALOGENS IN BREWERY PASTEURIZERS

Daniel A. Meier, Naperville, and Michael J. Groshans, Lombard, both of Ill., assignors to Nalco Chemical Company, Naperville, Ill.

Filed Apr. 11, 1988, Ser. No. 180,219

Int. Cl.[5] C23F *11/02, 11/06*

U.S. Cl. 422—9 **5 Claims**



1. A method of inhibiting the halogens vapor phase corrosion of the metal surfaces of beer pasteurizing units which utilize halogenated water which produces a halogen vapor phase which comprise treating these halogenated waters with from ¼ to 4 ppm of sulfamic acid for each ppm of halogen present in these waters and an alkalinizing amount of a soluble alkali.

4,929,425

COOLING WATER CORROSION INHIBITION METHOD

John E. Hoots; Donald A. Johnson; Dodd W. Fong, all of Naperville, and James F. Kneller, LaGrange, all of Ill., assignors to Nalco Chemical Company, Naperville, Ill.

Division of Ser. No. 861,763, May 9, 1986, Pat. No. 4,752,443. This application Feb. 12, 1988, Ser. No. 155,397

Int. Cl.[5] C23F *11/06*

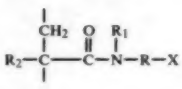
U.S. Cl. 422—13 **12 Claims**

1. A method for improving the performance of corrosion inhibitors in aqueous systems having hardness and a pH of at least 6.5 by dosing said system with:

From 10–50 ppm of a composition comprising:

I. a water-soluble inorganic phosphate capable of inhibiting corrosion in an aqueous alkaline environment, and

II. N-substituted acrylamide polymer containing an amide structure as follows:



where R_2 is hydrogen or methyl where R_1 is a hydrogen or an alkyl and R is alkylene or phenylene and X is, poly hyroxyl, poly carboxyl or carbonyl, and combinations thereof,

with the weight ratio of polymer:phosphate being within the range of 0.1:1 to 5:1.

4,929,426

PORTABLE BLOOD CHEMISTRY MEASURING APPARATUS

Balazs I. Bodai, Sacramento; Michael D. Grandon, Sausalito; Scott J. Gilbert, Cupertino; Douglas J. Littlejohn, Sunnyvale; Kyle E. Lemons, San Jose; Richard L. Fellows, Mountain View; Michael R. Barry, Palo Alto, and Michael D. Delapp, San Jose, all of Calif., assignors to Biologix, Inc., Sacramento, Calif.

Division of Ser. No. 115,714, Nov. 2, 1987. This application Nov. 2, 1988, Ser. No. 266,474

Int. Cl.[5] G01N *35/06*

U.S. Cl. 422—63 **4 Claims**

1. A portable apparatus for measuring the electrochemical characteristics of a sample, said apparatus comprising:

a shell housing a cartridge bay configured so as to receive a plurality of cartridges from a clip;

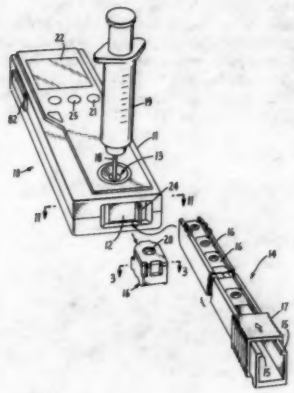
spring loaded means for advancing one of the cartridges into a measurement position within said shell;

measuring structure means for measuring an electrochemical characteristic of a sample;

means for in situ, automatic calibration of the measuring structure means within the cartridge prior to introduction of the sample into the cartridge when said cartridge is in the measurement position;

means for indicating the electrochemical characteristics of

the sample as measured by and received from the measuring structure means; and



means for ejecting the cartridge holding the sample from the shell after information corresponding to the electrical characteristics of the sample has been indicated.

4,929,427

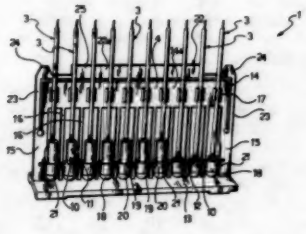
EQUIPMENT FOR MEASURING THE ERYTHROSETTLING RATE OF BLOOD USING PIPETTES

Piergiacomo Guala, Via Trotti, 20, 15100 Alessandria, Italy

Filed May 2, 1988, Ser. No. 188,973

Int. Cl.[5] B01L *9/06*

U.S. Cl. 422—100 **5 Claims**



1. Equipment for measuring the rate of erythrosettling, of a type which comprises in combination a plurality of pipettes, a rack for holding said pipettes upright, and a plurality of elements, each for closing the bottom end of a respective pipette, wherein said rack comprises an elongate pedestal, a portal attached to the pedestal, a plurality of seats constructed to receive and hold by snap action pipettes provided in the portal, a bridge element positioned and arranged to straddle the portal, wherein the bridge element is elastically movable from a home position to a working position to simultaneously remove each of the pipettes from the snap-action holding seats of the rack.

4,929,428

QUANTITATIVE PIPETTE

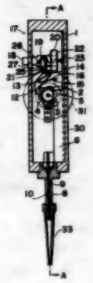
Sigeru Tezuka, Saitama, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 21, 1989, Ser. No. 312,697

Claims priority, application Japan, Feb. 19, 1988, 63-035124; Mar. 4, 1988, 63-49858

Int. Cl.[5] B01L *3/02;* **B67D** *5/08*

U.S. Cl. 422—100 **8 Claims**



1. A quantitative pipette comprising:

a frame having a liquid sample receiving chamber;

a shaft rotatably supported by said frame;

a ratchet mounted on said shaft for rotation therewith;

a pinion mounted on said shaft for rotation therewith;

a rack movably supported by said frame and engageable with said pinion, said rack being moveable between an ascended position and a descended position upon rotation of said pinion;

a plunger connected to said rack, said plunger being conjointly moveable with said rack and reciprocally moveable within said receiving chamber;

resiliently biased ratchet driving means supported by said frame for effecting rotation of said ratchet in a first direction;

fluid operative damping means supported by said frame for reducing the rotational speed of said ratchet in said first direction to a value not greater than a prescribed speed;

ratchet engaging means supported by said frame and engageable with said ratchet to limit rotation thereof in said first direction;

activating means supported by said frame and operative for rotating said ratchet in a second direction, opposite to said first direction and against the action of said driving means, and for rotating said pinion in said second direction to effect ascended movement of said rack; and

release means supported by said frame and operatively connected to said ratchet engaging means to permit intermittent disengagement of said ratchet engaging means from said ratchet, permitting intermittent rotation of said ratchet in said first direction, and thereby permitting similar rotation of said pinion in said first direction to effect descended movement of said rack;

whereby ascended movement of said rack effects corresponding movement of said plunger to suck a prescribed amount of liquid sample into said receiving chamber, and descended movement of said rack effects corresponding movement of said plunger to discharge the liquid sample from said pipette.

4,929,429
CATALYTIC CONVERTER

Richard P. Merry, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

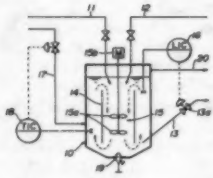
Filed Feb. 11, 1988, Ser. No. 155,086
Int. Cl.[5] F01N *3/28*
U.S. Cl. 422—179 14 Claims

1. In a catalytic converter having a metallic casing, a unitary, solid catalytic element disposed within said casing, and resilient means disposed between said catalytic element and said metallic casing for positioning said catalytic element and for absorbing mechanical and thermal shock, the improvement comprising; said resilient means being a resilient, flexible, fibrous mat of shot-free ceramic fibers having a stitchbonded compressed thickness in the range of 4 to 25 mm wrapped about the lateral surface of said catalytic element to a mount density of about 0.25 to about 0.50 g/cm^3.

4,929,430
PROCESS FOR PREPARATION OF URANIUM TETRAFLUORIDE

Keiichiro Otomura, Kurayoshi; Takayuki Yamashita, Tomata; Setsuo Kanemitsu, Kurayoshi; Shigetoshi Nakabayashi, Naka, and Hideo Miki, Yasu, all of Japan, assignors to Doryokuro Kakunenryo Kaihatsu Jigyodan, Tokyo, Japan

Filed Jun. 12, 1989, Ser. No. 365,115
Claims priority, application Japan, Jun. 23, 1988, 63-155780
Int. Cl.[5] C01G *56/00*
U.S. Cl. 423—11 5 Claims

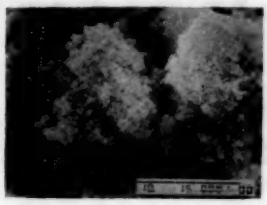


1. A process for preparing uranium tetrafluoride by reacting a uranous solution with a hydrofluoric acid solution in a fluorination precipitation tank, characterized in that (1) an inner tube of a cylindrical shape having upper and lower ends opened is arranged in said fluorination precipitation tank in the longitudinal direction thereof to partition the interior of said tank into a central portion and a peripheral portion, and an agitator is arranged in said inner tube to generate a descending or ascending stream in the central portion inside said inner tube and an ascending or descending stream in the peripheral portion outside said inner tube, whereby a reaction mother liquor in said tank is circulated to produce a completely mixed state; (2) the uranous solution and the hydrofluoric acid solution are introduced into said tank from the upper part thereof to react with each other to produce crystals of uranium tetrafluoride and the thus produced uranium tetrafluoride crystals are withdrawn from the lower part of said tank together with a part of the reaction mother liquor; and (3) the amount of the hydrofluoric acid solution added to the uranous solution is adjusted so that the concentration of fluorine in the reaction mother liquor in said tank is maintained at 2 to 4 g/l.

4,929,431
PROCESS FOR PRODUCING AMORPHOUS ALUMINOSILICATES

Zenji Hagiwara, Shiga; Satoshi Ando, Osaka, and Saburo Nohara, Hyogo, all of Japan, assignors to Hagiwara Research Corp., Shiga and Kanebo Ltd., Tokyo, both of, Japan

Continuation-in-part of Ser. No. 899,026, Aug. 22, 1986, abandoned. This application Aug. 10, 1987, Ser. No. 83,710
Claims priority, application Japan, Aug. 23, 1985, 60-185634; Aug. 23, 1985, 60-185635
Int. Cl.[5] C01B *33/26*
U.S. Cl. 423—328 5 Claims



1. A process for producing an amorphous aluminosilicate having an average particle size of no larger 0.5 μm and a specific surface area of at least 5 m^2/g having the formula:

$$xNA_2O.Al_2O_3.YSiO_2$$

wherein x is a number between 0.6 and 1.8 inclusive; and y is a number between 1.3 and 7 inclusive; which comprises:

maintaining an alkali solution (Solution-C), the alkalinity of which is within the range of 1.2–3.5 N under stirring;

adding a sodium aluminate solution (Solution-A), containing free alkali, and sodium silicate solution or collodial silica solution (Solution-B) containing free alkali, to the Solution-C, separately to prepare a slurry which contains an amorphous sodium aluminosilicate in the form of finely divided particles which are only slightly soluble in water; and

aging the slurry after completing said addition at 55° C. or lower for at least one hour until ripe, wherein the addition of Solution-A and Solution-B into Solution-C is carried out so that the Si/Al ratio in the resultant mixture is kept within the range of 0.7 to 7.6 during and after the addition, and mixing effected at 55° C. or lower, and Solution-A and Solution-B are prepared so that the alkalinity of the aqueous solution phase during the formation of the slurry and during the aging is kept within ±0.30 N of the alkalinity of Solution-C.

4,929,432
PROCESS FOR PRODUCING CRYSTALLINE SILICON NITRIDE POWDER

Wei-Ming Shen, Strongsville, Ohio, assignor to Union Carbide Corporation, Danbury, Conn.

Filed Oct. 19, 1988, Ser. No. 259,892
Int. Cl.[5] C01B *21/036, 33/06*
U.S. Cl. 423—344 18 Claims

1. A process for producing crystalline silicon nitride powders having at least a 90% α-Si_3N_4 phase, said process comprising the steps:

(a) preparing a gaseous mixture of ammonia and silane in which the molar ratio of ammonia to silane is from 7:1 to 18:1;

(b) heating the gaseous mixture of step (a) from 900° C. to 1450° C. for a time period sufficient to produce amorphous silicon nitride powders having less than 5% elemental silicon based on the weight of the powders; and

(c) heating the amorphous silicon nitride powders of step (b) in an inert atmosphere at a temperature from 1350° C. to 1800° C. for a time period sufficient to produce crystalline

silicon nitride powders comprising at least a 90% α-Si_3N_4 phase.

4,929,433

METHOD FOR THE PREPARATION OF SINTERABLE NITRIDES

Richard L. Hexemer, Jr., Lewiston; Scott R. Axelson, Frewsburg; Philip H. McCluskey, Alfred, and Thomas J. Mroz, Jr., Derby, all of N.Y., assignors to Alfred University, Alfred, N.Y.

Continuation-in-part of Ser. No. 111,831, Oct. 22, 1987, abandoned. This application Apr. 29, 1988, Ser. No. 188,236

Int. Cl.[5] **C01B** *21/072, 21/076;* **C04B** *35/58*

U.S. Cl. 423—411 **21 Claims**

1. A method of preparing a sinterable aluminum nitride powder which comprises

(a) mixing an aqueous solution or aqueous dispersion of an aluminum salt or of colloidal hydrated alumina with an aqueous solution or aqueous dispersion of a carboxylic acid polymer to form a precipitate,

(b) drying the precipitate, and

(c) calcining the precipitate in a nitriding atmosphere.

4,929,434

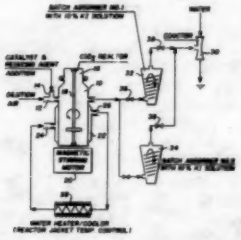
CATALYTIC GENERATION OF CHLORINE DIOXIDE

Derek G. Lobley, 18775 54th Avenue, Surrey, British Columbia, and Kenneth Pinder, 4195 Doncaster Way, Vancouver, British Columbia V6S 1W1, both of Canada

Filed Mar. 9, 1989, Ser. No. 321,009

Int. Cl.[5] **C01B** *11/02*

U.S. Cl. 423—479 **4 Claims**



1. In a process for producing chlorine dioxide by reducing a chlorate in sulphuric acid of at least 4N with a reducing agent the improvement comprising introducing into the process acetic anhydride.

4,929,435

MANUFACTURE OF HIGH PURITY LOW ARSENIC ANHYDROUS HYDROGEN FLUORIDE

Barry J. Bogheau, St. Clair Beach, Canada; Somanahalli N. Subbanna, East Amherst, N.Y.; Charles L. Redmon, Hamburg, N.Y., and Christian A. Wamser, Camillus, N.Y., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Continuation-in-part of Ser. No. 14,422, Feb. 12, 1987, Pat. No. 4,756,899. This application Jul. 11, 1988, Ser. No. 217,497

Int. Cl.[5] **C01B** *7/19;* **B01D** *3/34*

U.S. Cl. 423—484 **20 Claims**

1. A process for manufacturing anhydrous hydrogen fluoride with reduced levels of arsenic impurity from arsenic contaminated anhydrous hydrogen fluoride which comprises the steps of:

(a) contacting said anhydrous hydrogen fluoride with an effective amount of hydrogen peroxide to oxidize the arsenic impurity in the presence of a catalyst which comprises a catalytic amount of

(i) a component selected from the group consisting of an organic molybdenum compound, vanadium, and a vanadium compound and,

(ii) a phosphate compound, at a temperature and for a period of time sufficient to oxidize volatile trivalent arsenic impurities in the anhydrous hydrogen fluoride to non-volatile pentavalent arsenic compounds, and

(b) distilling the resulting mixture and recovering anhydrous hydrogen fluoride with reduced levels of arsenic impurity.

4,929,436

PROCESS FOR THE MANUFACTURE OF A POWDER OF MIXED METAL OXIDES, AND MIXED METAL OXIDE POWDERS

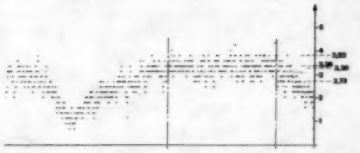
Franz Legrand, Quaregnon; Luc Lerot, and Patricia De Bruycker, both of Brussels, all of Belgium, assignors to Solvay & Cie (Societe Anonyme), Brussels, Belgium

Continuation of Ser. No. 165,298, Mar. 8, 1988, abandoned. This application Jun. 26, 1989, Ser. No. 372,185

Claims priority, application Belgium, Mar. 26, 1987, 08700311

Int. Cl.[5] **C01F** *1/00;* **C01G** *1/02*

U.S. Cl. 423—593 **10 Claims**



1. Process for the manufacture of a powder of mixed metal oxides, comprising dissolving metal alcoholates in an organic solvent to have an organic solution of metal alcoholates, treating the organic solution of the metal alcoholates with water in the presence of an acidic organic compound containing more than six carbon atoms in its molecule to cohydrolyze the metal alcoholates and precipitate mixed metal oxides as a powder without any bulk gelling, and collecting said powder with particles having a diameter not exceeding 5 microns.

4,929,437

COENZYME Q_{10} WITH HMG-COA REDUCTASE INHIBITORS

Jonathan A. Tobert, Maplewood, N.J., assignor to Merck & Co., Inc., Rahway, N.J.

Filed Feb. 2, 1989, Ser. No. 305,140

Int. Cl.[5] **A61K** *45/00, 31/405, 31/35, 31/12*

U.S. Cl. 424—10 **2 Claims**

1. A method of counteracting HMG-CoA reductase inhibitor-associated elevated transaminase levels in a subject in need of such treatment which comprises the adjunct administration of an effective amount of HMG-CoA reductase inhibitor and an effective amount of Coenzyme Q_{10}.

4,929,438

PREVENTIVES AND REMEDIES FOR MEDICINAL AND ALCOHOLIC POISONING

Kiichi Sawai; Masayasu Kurono; Hiromiotu Asai; Takahiko Mitani; Naohisa Ninomiya; Takao Sugiyama; Eiji Furukawa, and Hisashi Michishita, all of Nagoya, Japan, assignors to Kabushiki Kaisha Sanwa Kagaku Kenkyusho, Nagoya, Japan

Filed Feb. 15, 1989, Ser. No. 310,162

Claims priority, application Japan, May 13, 1988, 63-116336

Int. Cl.[5] **A61K** *27/00*

U.S. Cl. 424—10 **5 Claims**

1. A method for preventing or treating alcohol poisoning which comprises administering to an animal in need of such

treatment an effective amount of phytic acid or a pharmaceutically acceptable salt thereof.

4,929,439

COSMETIC SCREENING COMPOSITION IN THE FORM OF AN OIL-IN-WATER EMULSION COMPRISING A UV-A SCREENING COMPOUND AND A UV-B SCREENING COMPOUND AND ITS USE FOR THE PROTECTION OF THE SKIN AGAINST ULTRA-VIOLET RADIATION

Jean Cotteret, Verneuil-sur-Seine, and Jean F. Grollier, Paris, both of France, assignors to L'Oreal, Paris, France

Filed Feb. 4, 1988, Ser. No. 152,346

Claims priority, application Luxembourg, Feb. 6, 1987, 86762

Int. Cl.[5] A61K *7/40, 7/42, 7/44*

U.S. Cl. 424—59 **12 Claims**

1. In a sunscreening cosmetic composition that screens out ultraviolet radiation wavelengths between 280 and 400 nm. and that is in the form of an oil-in-water emulsion which contains 0.5 to 10% by weight of N-(2-ethylhexyl)-4-(3-methylidenecamphor) benzene sulfonamide in the oil phase of said emulsion, wherein said oil phase consists essentially of fats selected from the group consisting of modified mineral oils, unmodified mineral oils, modified vegetable oils, unmodified vegetable oils, modified animal oils, and unmodified animal oils, and waxes, esters of saturated fatty acids, esters of unsaturated fatty acids, synthetic oils, and C_{12}–C_{18} fatty alcohols and acids, wherein the improvement comprises adding 0.1 to 10% by weight of partially or fully neutralized benzene-[1,4-bis(3-methylidenecamphomethylsulphonic acid] to the aqueous phase of said emulsion, whereby the protection index of said sunscreening composition is increased.

4,929,440

PROCESS FOR THE PREPARATION OF (−) EBURNAMENIN-14-(15H)-ONE RESINATES

Fernando C. Mondelo, and Maria T. M. Ferrero, both of Madrid, Spain, assignors to Covex, S.A., Madrid, Spain

Division of Ser. No. 926,561, Oct. 31, 1986, abandoned. This application Mar. 22, 1988, Ser. No. 171,672

Claims priority, application Spain, Nov. 8, 1985, 548735

Int. Cl.[5] A61K *31/795*

U.S. Cl. 424—79 **2 Claims**

1. The (−)eburnamenin-14-(15H)-one resinates, wherein the cationic resin is selected from polyvinyl or aryl sulfonates copolymerized with 3–12 divinyl benzene.

4,929,441

UNNATURAL SEX ATTRACTANTS FOR MALE PINK BOLLWORMS AND PINKSPOTTED BOLLWORMS AND USE THEREOF

Hollis M. Flint, and John R. Merkle, both of Tempe, Ariz., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Continuation of Ser. No. 600,259, Apr. 13, 1984, abandoned. This application Nov. 20, 1985, Ser. No. 800,891

Int. Cl.[5] A01N *25/00*

U.S. Cl. 424—84 **14 Claims**

1. A composition comprising a mixture of first and second pheromone dispensers selected from the group consisting of flake dispensers, hollow fibers, and microcapsules, wherein said first dispenser contains Z,Z- or Z,E-isomer of 7-11-hexadecadien-1-ol acetate in an amount sufficient to shift the preference of a male pink boolworm from a volume ratio of Z,Z-:Z,E-isomer naturally occurring in the pheromone emitted by a female pink boolworm and to a different volume ratio, and wherein said second dispenser contains an effective attractant amount of Z,Z- and Z,E-isomers of 7,11-hexadecadiene-1-ol acetate, wherein said Z,Z-:Z,E-isomer volume ratio in said second dispenser is about 75:25 to 99:1 when said first dispenser contains Z,Z-isomer, and wherein said Z,Z-:Z,E-isomer volume ratio in said second dispenser is about 25:75 to 1:99 when said first dispenser contains Z,E-isomer.

4,929,442

COMPOSITIONS SUITABLE FOR HUMAN TOPICAL APPLICATION INCLUDING A GROWTH FACTOR AND/OR RELATED MATERIALS

Maxwell M. Powell, Great Neck, N.Y., assignor to Exovir, Inc., Great Neck, N.Y.

Filed Sep. 26, 1986, Ser. No. 912,828

Int. Cl.[5] A61K *37/66, 45/05, 37/02*

U.S. Cl. 424—85.2 **12 Claims**

1. A composition suitable for topical or subcutaneous application to a human for the treatment of cancerous or virus-caused skin disorders consisting essentially of a physiologically acceptable carrier, an antiviral or anti-cancer effective amount of a biologically active material selected from the group consisting of tissue plasminogen activator (t-PA), epidermal growth factor (EGF), transforming growth factor-alpha (TGF-α), transforming growth factor-beta (TGF-β), human endothelial cell growth factor (ECGF), granulocyte macrophage colony stimulating factor (GM-CSF), and a fibronectin or large external transformation sensitive protein (LETS) selected from the group of cell surface protein (CSP), cell adhesion protein (CAP), cell insoluble globulin (CIG) and opsonic-alpha 2 surface binding protein, an effective antiviral amount of an antiviral surfactant, an effective antiviral amount of human interferon and an effective amount of an adjuvant to assist in the transdermal transport or transfer of said composition through the skin.

4,929,443

METHOD OF TREATING INTERFERON SENSITIVE DISEASES, AND A METHOD AND DEVICE FOR PREPARING γ-INTERFERON CONTAINING PREPARATION

Ragnvald E. Lindblom, Alsiter, S-740 10 Almunge, and Ulf S. Rothman, Box 120, S-230 10 Skanör, both of Sweden

Continuation of Ser. No. 711,567, Feb. 13, 1985, abandoned, which is a continuation of Ser. No. 503,575, Jun. 13, 1983, abandoned. This application May 18, 1987, Ser. No. 50,470

Int. Cl.[5] A61K *45/02;* **C12P** *21/00*

U.S. Cl. 424—85.5 **6 Claims**

1. A method of treating interferon sensitive diseases, comprising the steps of taking a whole blood sample from a human or animal patient suffering from such disease, incubating said whole blood sample in vitro in the presence of a mitogen to produce γ-interferon, subjecting said incubated whole blood sample to a separation step so as to produce a blood plasma preparation which is free of said mitogen but contains a therapeutically effective amount of said produced γ-interferon, and re-administering said blood plasma preparation to the same patient.

4,929,444

LOW PH PHARMACEUTICAL FORMULATION CONTAINING T-PA

Michael D. Johnston, Beckenham, England, and Henry Berger, Cary, N.C., assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

Filed May 13, 1986, Ser. No. 862,817

Claims priority, application United Kingdom, May 28, 1985, 8513358; Aug. 31, 1985, 8521705

Int. Cl.[5] A61K *37/547*

U.S. Cl. 424—94.64 **22 Claims**

1. A lyophilized pharmaceutical formulation of t-PA having been prepared by vacuum drying a frozen sterilized unbuffered aqueous solution of t-PA, in which the pH is from 2 to 5.

4,929,445

METHOD FOR INHIBITING *LISTERIA MONOCYTOGENES* USING A BACTERIOCIN

Peter A. Vandenbergh; Michael J. Pucci, both of Sarasota; Blair S. Kunka, Bradenton, and Ebenezer R. Vedamuthu, Bradenton, all of Fla., assignors to Microlife Technics, Inc., Sarasota, Fla.

Filed Jan. 25, 1988, Ser. No. 148,044

The portion of the term of this patent subsequent to May 23, 2006, has been disclaimed.

Int. Cl.[5] A01N *59/00, 65/00;* A23C *9/12*

U.S. Cl. 424—115 26 Claims

1. A method for inhibiting growth of *Listeria monocytogenes* in an unspoiled material which can be contaminated with the *Listeria monocytogenes* which comprises:

providing a bacteriocin in an unspoiled material in an effective amount which inhibits the *Listeria monocytogenes*, wherein the bacteriocin is derived from a *Pediococcus acidilactici* containing DNA derived from a plasmid measuring about 9.4 kilobase pairs in molecular size which encodes for the production of the bacteriocin and wherein the bacteriocin inhibits the *Listeria monocytogenes* in a pH range between about pH 4 to 9.

4,929,446

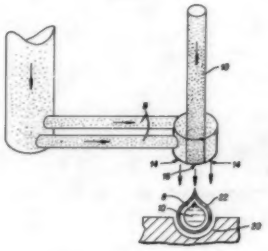
UNIT DOSAGE FORM

Raymond A. Bartolucci, New City, N.Y., assignor to American Cyanamid Company, Stamford, Conn.

Filed Apr. 19, 1988, Ser. No. 183,683

Int. Cl.[5] A61K *47/00*

U.S. Cl. 424—439 16 Claims



1. An edible unit dosage form for delivering a medicament selected from the group consisting of menthol, eucalyptus, benzocane, dextramethorphan or a mixture of any of the foregoing comprising:

(a) an outer relatively hard, unitary shell consisting essentially of a sugar which crystallizes slowly from the melt, said sugar consisting of sucrose, glucose or a mixture thereof; and

(b) a liquid or semi-solid center core contained within said shell comprising an accurate dose of a medicament, said dose being within about ±5% by weight of the prescribed dosage.

4,929,447

ENCAPSULATION COMPOSITION FOR USE WITH CHEWING GUM AND EDIBLE PRODUCTS

Robert K. Yang, Randolph, N.J., assignor to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 816,769, Jan. 7, 1986. This application Jun. 29, 1987, Ser. No. 67,894

Int. Cl.[5] A61K *9/68*

U.S. Cl. 424—440 12 Claims

7. An edible product comprising an encapsualted active ingredient which is protected from moisture deterioration and which exhibits controlled release, wherein said active ingredient is selected from the group consisting of soluble dietary fibers, bio-effecting agents, and mixtures thereof and said encapsulant is solvent-free and comprises a blend of high molecular weight polyvinyl acetate and a hydrophobic plasticizer in an edible matrix wherein the active ingredient and encapsulant are mixed in a melt blend.

4,929,448

ORAL COMPOSITION CONTAINING PARTICLES COMPRISING AN ACTIVE SUBSTANCE

Lars S. Ibsen, Frederiksberg, Denmark, assignor to A/S Alfred Benzon, Copenhagen, Denmark

Filed Mar. 11, 1988, Ser. No. 166,638

Claims priority, application Denmark, Mar. 13, 1987, 1302/87

Int. Cl.[5] A61K *9/14, 9/50*

U.S. Cl. 424—489 22 Claims

1. An oral composition in dry form adapted to be reconstituted in water, the composition comprising a multiplicity of solid particles which have sizes and shapes such that they normally feel gritty and which remain solid after reconstitution with water, the particles:

(a) containing at least one active substance selected from the group consisting of drugs, vitamins and nutrients; and

(b) comprising a viscosity-increasing substance which, upon reconstitution with water, provides the surfaces of the particles with an aqueous masking surface layer of higher viscosity than the viscosity prevailing in the aqueous medium resulting from reconstitution with water, the masking surface layer being in intimate contact with the surfaces of the solid particles and thereby reducing the grittiness of said particles and/or contributing to masking any unpleasant taste of the active substance, and said viscosity-increasing substance being selected from the group consisting of:

(i) at least one gelling or swelling agent,

(ii) a substance having a redox potential such that, in the aqueous medium resulting from reconstitution with water, it is oxidized or reduced,

(iii) a substance which forms a salt or chelate with a gelling or swelling agent dispersed in said aqueous medium, and

(iv) a surfactant which reduces the surface tension of the water in said aqueous medium.

4,929,449

CONTAINERS FOR REDOX ACTIVE ELECTROLYTES AND METHOD OF USING SAME

Richard L. Veech, Laboratory of Metabolism, NIAAA, Room 55A, 12501 Washington Ave., Rockville, Md. 20852

Continuation-in-part of Ser. No. 810,815, Dec. 18, 1985, abandoned. This application Dec. 17, 1986, Ser. No. 940,331

Int. Cl.[5] A61K *33/00, 31/22*

U.S. Cl. 424—700 2 Claims

1. A method for preparing a therapeutic aqueous solution which contains dissolved therein carbon dioxide, said method comprising the steps of:

(A) charging a first composition into a first chamber of a container,

(B) charging a second composition into a second chamber of said container, each of said first and second chambers being hermetically sealed with said respective compositions therein, and said container being hermetically sealed with respect to each of said chambers, each of said chambers being in communicatable relationship with the other thereof while said container is in such sealed condition, and said container including means for externally producing communication between said respective first and second chambers,

(C) opening a communication pathway between said first and said second chambers,

(D) intermixing the first composition with the second composition within said sealed container, and

(E) administering the resulting so formed therapeutic aque-

ous solution containing dissolved therein said carbon dioxide,

said second composition being a dry powder consisting essentially of at least one material selected from the group consisting of redox active metabolite ketoacids and metabolite sulfhyryl-containing amino acids, said first composition being an aqueous solution containing dissolved therein at least one material selected from the group consisting of (a) inorganic electrolytes, (b) nutrients, and (c) stable metabolites and an above ambient concentration of dissolved carbon dioxide.

4,929,450

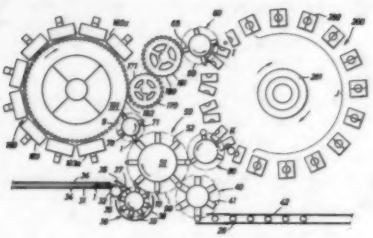
DELIVERY APPARATUS IN MACHINE FOR PREPARING PLASTIC HOLLOW VESSELS

Nobuyuki Takakusaki, Yokohama; Yohji Mizutani; Nobuhiro Kishida, both of Tokyo, and Manabu Hosokawa, Kawasaki, all of Japan, assignors to Toyo Seikan Kaisha, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 82,466, Aug. 7, 1987, Pat. No. 4,790,741. This application Jan. 14, 1988, Ser. No. 144,717

Int. Cl.[5] B29C *49/36*

U.S. Cl. 425—526 **3 Claims**



1. A delivery apparatus in a machine for preparing drawn plastic hollow vessels, said delivery apparatus comprising:

(A) a mandrel for supporting a preform composed of a plastic material and a hollow vessel formed from the preform;

(B) a loading means for loading the preform on the mandrel;

(C) a preheating means having a rotary turret comprising a plurality of supporting seats for supporting the mandrel on the periphery thereof and a heating mechanism arranged along the periphery of the turret to heat the preform loaded on the mandrel;

(D) a blow-forming means comprising a rotary member having, arranged along the periphery thereof, a plurality of openable and closable blow-forming molds and mandrel-supporting members corresponding to said molds;

(E) a delivery means for delivering the preheated preform-loaded mandrel to the blow-forming means from the preheating means; and

(F) a withdrawal means for withdrawing the blow-formed vessel-loaded mandrel from the blow-forming means;

wherein said loading means comprises:

(1) a preform supply mechanism for supplying the preform;

(2) a unitary preform-loading and vessel-unloading mechanism for pushing the preform coming from the supply mechanism onto the mandrel to fix the preform thereto and withdrawing the vessel from the vessel-loaded mandrel supplied from the withdrawal means;

a preform delivery mechanism for delivering the preform-loaded mandrel to the preheating means; and

(4) a vessel delivery mechanism for delivering the vessel withdrawn from the mandrel to the outside of the apparatus from the loading and unloading mechanism;

wherein said preform-loading and vessel-unloading mechanism comprises:

(a) a first rotary member,

(b) a clamping mechanism having grippers arranged equidistantly along the periphery of said first rotary member to hold the neck portions of the preform and vessel,

(c) an opening and closing drive mechanism for opening and closing the grippers of the clamping mechanism,

(d) a reciprocating drive mechanism for driving the clamping mechainsm reciprocatively in the axial direction of said first rotary member,

(e) a second rotary member arranged coaxially with said first rotary member below said first rotary member and spaced therefrom in the axial direction, and

(f) mandrel supporting seats arranged equidistantly along the periphery of the second rotary members and located at positions coaxial with the positions for gripping the neck portions of the preform and vessel in the clamping mechanism;

said preform supply mechainsm, said preform delivery mechanism, said vessel withdrawal means and the vessel delivery mechanism being arranged in the recited order in the rotation direction of the first and second rotary member along the periphery of the preform-loading and vessel-unloading mechanism; and

said opening and closing drive mechanism and said reciprocating drive mechanism for the clamping mechanism being timed with each other so that motions (i) and (vi) occur in operation;

(i) the grippers close to hold the preform from the preform supply mechanism,

(ii) the grippers move downwardly to insert the preform onto the mandrel,

(iii) the grippers open to release the preform to the preform delivery mechanism,

(iv) the grippers close to hold the neck portions of the vessel from the vessel withdrawal means,

(v) the grippers move upwardly to withdraw the vessel from the mandrel, and

(vi) the grippers open to release the vessel to the vessel delivery mechanism.

4,929,451

PROCESS FOR ELIMINATING DISAGREEABLE ODOR FROM SOYA MILK

Seishi Takenawa, Nara; Hideki Takeda, Tenri, and Mie Horikoshi, Higashiosaka, all of Japan, assignors to Fujisawa Pharmaceutical Company, Ltd., Osaka, Japan

Filed Feb. 6, 1989, Ser. No. 306,558

Claims priority, application Japan, Feb. 12, 1988, 63-31107

Int. Cl.[5] A23J *1/14*; A23L *1/20*

U.S. Cl. 426—10 **6 Claims**

1. A process for preparation of disagreeable odors-free soya milk which comprises

soaking raw soybean in water,

draining,

grinding the soaked soybean with water whose dissolved oxygen has been decreased by addition of glucose and glucose oxidase,

steaming the ground soybean, and filtering the resulting materials to obtain disagreeable odors-free soya milk.

4,929,452

METHOD FOR RAPIDLY FERMENTING ALCOHOLIC BEVERAGES

Mostafa K. Hamdy, Athens, Ga., assignor to University of Georgia Research Foundation, Inc., Athens, Ga.

Continuation of Ser. No. 103,049, Sep. 30, 1987, abandoned. This application Jun. 22, 1989, Ser. No. 370,839

Int. Cl.[5] C12C *11/00*; C12G *1/00, 3/00*

U.S. Cl. 426—11 **13 Claims**

1. A process for producing an alcohol solution comprising fermenting a sugar mixture with a strain of *Saccharomyces cerevisiae* which can tolerate alcohol concentrations of greater than 12% and sugar concentrations of greater than 20%, wherein said strain of *S. cerevisiae* rapidly ferments sugar substrates, producing alcohol at a rate of at least about 0.026 grams alcohol per hour per gram sugar per 10^{12} yeast cells.

4,929,453

SOYBEAN PROTEIN CLOTTING ENZYME PRODUCED BY MICROORGANISM FERM BP-1778

Tatuo Emura, Sapporo, and Kiyoshi Ohba, Chitose, both of Japan, assignors to Kabushiki Kaisha Hokkaido Nissin, Hokkaido, Japan

Division of Ser. No. 167,508, Mar. 14, 1988, Pat. No. 4,885,178. This application Mar. 29, 1989, Ser. No. 330,005

Int. Cl.[5] C12N *9/54*

U.S. Cl. 426—63 **1 Claim**

1. An essentially pure soybean protein clotting enzyme produced by a Bacillus microorganism designed FERM BP-1778 and having the following properties;

(a) approximately 30000 molecular weight;

(b) a first peak soybean protein clotting activity at a temperature of about 80° C. and a second peak soybean clotting activity at a temperature of about 65° C.;

(c) stable for 30 min. at a temperature of 35°–40° C.;

(d) stable for 17 hours at a temperature of 4° C. under a pH condition ranged from pH 4 to 9 with 70% soybean protein clotting activity remaining;

(e) an increased soybean protein clotting activity at a pH range below 6.0 and termination of soybean protein clotting activity at a pH range above 7.0;

(f) said first peak soybean protein clotting activity being completely inhibited by phenyl methyl sulfonyl fluoride and tosyl fluorine, and said second peak soybean protein clotting activity being completely inhibited by ethylene diamine tetra-acetic acid; and

(g) a soybean protein clotting activity without influence of metal ions thereupon.

4,929,454

WOOD TREATMENT COMPOSITION

David M. Findlay, deceased, late of Terrasse Vaudreuil (by Jean Findlay, executrix), and Neil G. Richardson, St-Laurent, both of Canada, assignors to Domtar Inc., Montreal, Canada

Continuation-in-part of Ser. No. 231,588, Feb. 5, 1981, abandoned. This application Oct. 18, 1985, Ser. No. 788,881

Int. Cl.[5] A01N *59/20*

U.S. Cl. 424—638 **11 Claims**

1. A method of preserving wood which comprises impregnating a wood substrate with a wood preservative formulation comprising an aqueous ammoniacal solvent comprising ammonium hydroxide having a wood treating composition dissolved therein; where said composition contains a quaternary ammonium compound and a metallic cation consisting essentially of at least one of copper and zinc, where said quaternary ammonium compound can be represented by the general formula $(R_1R_2R_3R_4N^+)X^-$, where R_1 and R_2 are independently chosen from the group consisting of alkyl groups having 1 to 3 carbon atoms, R_3 is chosen from the group consisting of alkyl groups having 8 to 20 carbon atoms, and R_4 is chosen from the group consisting of alkyl groups having 8 to 20 carbon atoms, aryl groups and aryl-substituted alkyl groups where said substituted alkyl groups have 1–3 carbon atoms and X^- is chosen so as to render said quaternary ammonium compound soluble in said ammoniacal solvent where said quaternary ammonium compound and said metallic cation are present in said formulation in biocidally effective amounts, and where the ratio of said quaternary ammonium compound to said metallic cation ranges from about 0.003 to about 30.

4,929,455

FLOUR-BASED POT PIE CRUSTS WITH IMPROVED TEXTURE

James M. Connaughton, Jr., Alworth, Ga.; James E. Sexton, Cincinnati, Ohio, and James A. Hegener, Cold Spring, Ky., assignors to Mallinckrodt, Inc., St. Louis, Mo.

Filed Jul. 7, 1988, Ser. No. 216,031

Int. Cl.[5] A21D *8/00*; A23L *3/00*

U.S. Cl. 426—92 **11 Claims**

1. A microwavable flour-based pot pie comprising a food filling and a flour-based crust composition made from a dough consisting essentially of an intimate mixture of flour and a protein having low affinity for water upon storage separately added thereto throughout said mixture, said protein selected from the group of zein, soy isolate, gliadin, hordein or mixtures thereof in an amount adapted to obtain a firm texture throughout the crust composition upon microwave cooking.

4,929,456

MELTING TOLERANT SAUCE AND SEASONING PARTICULATE

Celso O. Bejarano-Wallens; Julie E. Gage, both of East Windsor, N.J., and Donald Hodapp, Boise, Id., assignors to Kraft General Foods, Inc., Glenview, Ill.

Filed Aug. 25, 1988, Ser. No. 236,566

Int. Cl.[5] A23L *1/39*

U.S. Cl. 426—99 **10 Claims**

1. A process for preparing a melting tolerant, portioned controlled sauce and seasoning particulate comprising the steps of:

(a) a first mixture comprising a 3–14% gelatin solution in water and combining same with a seasoning blend;

(b) preparing a second mixture comprising non-solid ingredients selected from a group consisting of soy sauce, beef base, sesame oil, mustard, heavy cream, margarine, tomato base, olive oil, mushroom base, lemon juice, processed swiss cheese, parmesan cheese, chicken base, cheese flavors and combinations thereof;

(c) combining the first mixture in amount ranging from 50% to 85% to the second mixture in amounts ranging from 10% to 50% by weight and mixing to form a uniform mixture;

(d) heating the said uniform mixture with agitation for a time ranging from 1 to 5 minutes and at a temperature ranging from 180° F. to 190° F. effective to pasteurize the said mixture;

(e) cooling the pasteurized sauce mixture with agitation to a temperature ranging from 70° F. to 130° F.;

(f) depositing the cooled sauce onto a freezer belt to form particulate drops of sufficient size to provide portion control;

(g) maintaining the particulate drops on the freezer belt for sufficient time to freeze said particulate drops to temperatures ranging from −5° F. to −15° F.;

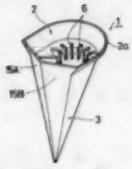
(h) removing the frozen sauce particulate drops from the freezer belt; and,

(i) freezing to temperatures ranging from 0° F. to −15° F. for packaging.

4,929,457
ICE-CREAM CONES

Takayoshi Sato, 97-5, Ohganedaira 2-chome, Matsudo-shi, Chiba-ken, Japan

Filed Dec. 28, 1988, Ser. No. 291,295
Claims priority, application Japan, Dec. 30, 1987, 62-336131
Int. Cl.[5] A21D *13/00*
U.S. Cl. 426—139 4 Claims



1. An ice-cream cone comprising an elongated molded shell having an open top portion and a closed bottom portion,

said open top portion comprising an integral annular bowl-shaped holding part for receiving and holding ice cream, said holding part lying horizontal relative to the vertically extending longitudinal axis of said cone,

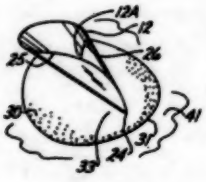
said closed bottom portion integrally extending downwardly from said top portion and constituting a gripping part for gripping the ice-cream cone, said closed bottom portion gradually converging in diameter to an end distal to the open top portion,

said molded shell having a plurality of walls including a pair of vertical flat radial walls, each vertical wall extending continuously from the top of said holding part to said converged bottom closed end, and each vertical wall being formed in the shape of an inverted triangle and angularly connected to each other at their respective adjacent vertical sides, said pair of vertical walls being vertical relative to the horizontally oriented holding part and converging at an angle relative to each other such that a plurality of at least three ice-cream cones can be positioned with their respective vertical walls adjacent and abutting each other in a united state while simultaneously maintaining the holding parts horizontal.

4,929,458
METHOD OF MAKING A CONICALLY SHAPED TORTILLA SHELL

Leo P. Smietana, 16696 Forrest St., Victorville, Calif. 92392

Division of Ser. No. 293,889, Jan. 5, 1989. This application Sep. 21, 1989, Ser. No. 410,314
Int. Cl.[5] A23L *1/164;* A23P *1/10*
U.S. Cl. 426—391 8 Claims



1. A method of making a conically shaped tortilla shell, which comprises:

placing a pliable corn or wheat flour tortilla patty having a rounded tip end portion on a substantially flat surface;

positioning a conically shaped mold, having an apex portion and a pair of overlapping sides, on its side on the surface of said tortilla patty;

aligning the rounded tip end portion of said tortilla patty adjacent the apex portion of said mold;

moving relative to one another the mold and said aligned rounded tip end portion of the tortilla patty to wrap the tip end portion about the apex portion of said mold;

moving a peripheral surface, near the rounded tip end portion of said patty, into engagement flatly against the apex portion of the mold;

holding the peripheral surface firmly against said apex portion;

rolling the patty and the mold along the substantially flat surface until the patty peripheral surface commences to be moved under the mold and against the top surface of the patty adjacent its rounded tip end portion;

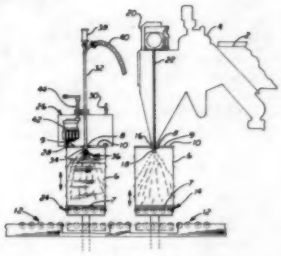
continuing to roll said mold and said patty to cause the rounded tip end portion of the patty to tuck inwardly to form a closed apex tucked in portion thereby forming a conically shaped tortilla shell having a closed apex portion; and then

removing the conically shaped tortilla shell from said mold.

4,929,459
METHOD OF FILLING DRUMS WITH COOKED SOLID FOOD PRODUCTS

Jesus A. Silvestrini, Mendoza, Argentina, assignor to IMDEC S.A., Mendoza, Argentina

Continuation-in-part of Ser. No. 216,874, Jul. 8, 1988. This application Oct. 17, 1988, Ser. No. 258,730
Int. Cl.[5] A23L *3/00*
U.S. Cl. 426—399 7 Claims



1. A method of filling drums with cooked, sterile pieces of solid food products in a packing liquid, comprising the sequential steps of

a. sterilizing the interior of an empty drum, which drum comprises a substantially rigid cylinder having at one axial end thereof a base closed by a base member and at the opposite axial end a head closed by a head member;

b. depositing by gravity flow and at substantially atmospheric pressure into said sterilized drum through an opening in said head member a predetermined quantity of cooked, sterile pieces of solid food product having a temperature of not less than 200° F. and substantially without packing liquid;

c. engaging said drum head in a pressure-tight manner with a liquid filling head and maintaining said pressure-tight engagement between said drum head and said liquid filling head throughout said filling process while exposing the exterior of said drum base and the drum sides to ambient conditions;

d. introducing pressurized steam through said liquid filling head into said drum and thereby expelling substantially all air from within said drum and maintaining within said drum and between said drum head and said liquid filling head steam pressure substantially greater than atmospheric pressure;

e. introducing through said liquid filling head and into said drum and onto said quantity of pieces of solid food product a quantity of food packing liquid sufficient to substantially fill the space remaining in said drum;

f. applying an air-tight seal to said drum head member opening, whereby the drum is sealed against outside contaminants, and

g. releasing said steam pressure from said liquid filling head and removing said liquid filling head, whereby the filled and sealed drum may be removed for cooling and storing.

4,929,460

ELASTOMERIC SILICONE BINDING THREADS FOR COOKABLE FOODSTUFF ITEMS

Robert Lagarde, Feyzin; Daniel Ariagno, Craponne, and Jacques Nys, Le Chesnay, all of France, assignors to Rhone-Poulenc Specialites Chimiques, Courbevoie, France

Division of Ser. No. 338,559, Apr. 14, 1989, which is a continuation of Ser. No. 939,031, Dec. 8, 1986, abandoned. This application Oct. 3, 1989, Ser. No. 416,403

Claims priority, application France, Dec. 6, 1985, 85 18287

Int. Cl.[5] **B65B** *25/06, 25/22*

U.S. Cl. 426—420 **11 Claims**

1. A process for wrapping a food product to be cooked comprising the steps of: providing a tie comprising a silicone elastomer capable of being heated up to 250° C.; wrapping said food with said provided tie; and securing said tie to said food product.

4,929,461

PROCESS FOR PRODUCING BATCH TYPE POTATO CHIPS ON A CONTINUOUS BASIS

Sylvia L. Schonauer; Linda M. Medina, both of Irving, and Donald V. Neel, Lewisville, all of Tex., assignors to Frito-Lay, Inc., Dallas, Tex.

Continuation of Ser. No. 6/944,208, Dec. 22, 1986, abandoned. This application Oct. 25, 1988, Ser. No. 262,127

Int. Cl.[5] **A23L** *1/217*

U.S. Cl. 426—438 **10 Claims**

1. A continuous process for the production of potato chips having batch-fried texture and flavor characteristics comprising:

(a) continuously introducing potato slices into an initial frying region of frying oil, the initial frying region having a temperature of from about 115° C. to about 155° C. (about 240° F. to about 310° F.);

(b) preparing partially fried potato slices by partially frying the potato slices in the initial frying region for at least 1 minute;

(c) continuously conveying the partially fried potato slices from said initial frying region to a final frying region of frying oil, the final frying region having a temperature of about 165° C. to about 185° C. (about 330° F. to about 365° F.);

(d) producing potato chips having batch-fried texture and flavor characteristics by finish-frying the partially fried potato slices in the final frying region to about the bubble end point of the potato slices; and

(e) continuously removing the potato chips from the final frying region of frying oil.

4,929,462

METHOD AND APPARATUS FOR CONTINUOUS CONTACT OF SUPERCRITICAL FLUID WITH PARTICULATE SOLIDS

Charles T. Moorman, Harrington Park; Joseph L. Sabadics, Nutley, and Joseph A. Bruscino, Saddle Brook, all of N.J., assignors to Kraft General Foods, Inc., Glenview, Ill.

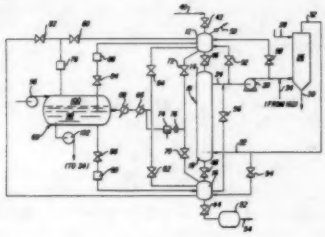
Filed Jun. 21, 1989, Ser. No. 368,729

Int. Cl.[5] **A23F** *5/20;* **B01D** *11/02*

U.S. Cl. 426—478 **31 Claims**

1. In a method of contacting particulate solid matter with a fluid in an elongate pressure vessel which comprises continuously passing a supercritical fluid through an elongate pressure vessel at supercritical pressure while periodically moving the particulate solid matter through the pressure vessel via isolatable pressurizable vessels, said pressurizable vessels being periodically pressurized to the supercritical pressure of said fluid for facilitating the periodic movement of particulate solid matter between said pressurizable vessels and said pressure vessel, and depressurized for facilitating the periodic movement of said solid particulate solid matter into and out of said pressurizable vessels, the improvement wherein pressurizing said pressurizable vessels comprises:

(a) maintaining a supply of said fluid at an intermediate,



non-critical pressure, at which pressure said fluid exists in both the liquid and gaseous state;

(b) introducing into said pressurizable vessels said fluid, in the gaseous state, from said supply of said fluid maintained at said intermediate pressure, to raise the pressure within said pressurizable vessels;

(c) introducing into said pressurizable vessels said fluid, in the liquid state, from said supply of fluid to further raise the pressure within said vessels to approximately the pressure of the fluid in said supply; and

(d) introducing, into said pressurizable vessels, said fluid in the supercritical state, to further raise the pressure within said vessels to the supercritical state.

4,929,463

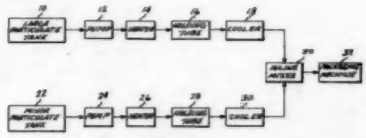
PROCESS FOR ASEPTIC PREPARATION OF PARTICULATE FOOD PRODUCTS

Richard S. Meyer, Tacoma, Wash., assignor to Curtice-Burns, Inc., Rochester, N.Y.

Continuation-in-part of Ser. No. 231,592, Aug. 10, 1988, abandoned, which is a continuation of Ser. No. 929,061, Nov. 7, 1986, abandoned. This application Mar. 1, 1989, Ser. No. 317,828

Int. Cl.[5] **A23L** *3/18*

U.S. Cl. 426—521 **10 Claims**



1. A process for the aseptic preparation of food products containing a large particulate component and a minor particulate component comprising:

(a) treating a stream of said large particulate component to sterilize said component, said large particulate component comprising a plurality of large particles, all flowing at substantially the same velocity;

(b) treating a stream of said minor particulate component separately from said large particulate component to sterilize said minor particulate component, said minor particu-

late component comprising a plurality if minor particles, all flowing at substantially the same velocity; and,

(c) combining said treated large particulate component and said treated minor particulate component for packaging.

4,929,464

FROZEN DONUT BATTER AND METHOD FOR PREPARING COOKED PRODUCT THEREFROM

Marvin R. Willyard, Franklin, and Jean M. Lingg, Hales Corners, both of Wis., assignors to Ph. Orth Co., Oak Creek, Wis.

Filed Mar. 27, 1989, Ser. No. 329,357

Int. Cl.[5] A21D *6/00*

U.S. Cl. 426—549 **9 Claims**

1. A process for preparing cake donuts consisting of a first step of preparing a cake donut batter, a second step of forming donuts from said batter, a third step of freezing said formed donuts, and a final step of deep frying said donuts without thawing same and wherein the cross-sectional area of said donuts is selected to permit adequate interior cooking before the exterior of said donut becomes overcooked.

4,929,465

CONTROL OF SYMMETRY OF MICROWAVE CAKES

Hanny Kanafani, Champlin; Bruce M. Patrick, Richfield, and William A. Atwell, Andover, all of Minn., assignors to The Pillsbury Company, Minneapolis, Minn.

Division of Ser. No. 113,134, Oct. 27, 1987, Pat. No. 4,847,100. This application Mar. 13, 1989, Ser. No. 322,597

Int. Cl.[5] A23L *1/00*; A21D *10/04*

U.S. Cl. 426—552 **16 Claims**

1. A culinary mix for preparing a starch-based batter for cakes with controlled symmetry comprising:

(a) from about 60% to about 85% by weight of a mixture of sugar and flour; and

(b) a sufficient amount of a leavening system effective to provide a gas evolution in the range of between about 38 cc and about 118 cc when combined with at least one liquid to form a starch-based batter, the batter forming a cake layer with controlled symmetry when exposed to microwave radiation.

4,929,466

FOOD AND FEEDSTUFF

Maud I. C. Knutsson, Vagnhärad, Sweden, assignor to Ewos Aktiebolag, Sodertalje, Sweden

Filed May 3, 1988, Ser. No. 190,269

Claims priority, application Sweden, May 5, 1987, 8701839

Int. Cl.[5] A23K *1/17*

U.S. Cl. 426—615 **15 Claims**

2. A method for the preparation of a feedstuff comprising vegetable matter in combination with an antibacterial system, the antibacterial system being selected from the group consisting of a lactoperoxidase-thiocyanate hydrogen peroxide donor and a salivary peroxidase-thiocynate-hydrogen peroxide donor, comprising deactivating the vegetable peroxidases present in the vegetable matter by heat treating the vegetable matter for at least 15 minutes and combining said deactivated vegetable matter with said antibacterial system.

4,929,467

PROCESSES FOR PRODUCTS FROM LOTUS

Karen M. Slimak, 9207 Shotgun Ct., Springfield, Va. 22153

Filed Jan. 31, 1986, Ser. No. 825,660

Int. Cl.[5] A23L *1/214*

U.S. Cl. 426—637 **18 Claims**

1. A non-grain edible flour possessing the ability to maintain a risen structure in the absence of grain flour, legume flour, or added fiber, said non-grain edible flour consisting essentially of comminuted particles of the entire lotus including substantially all of the starch and fiber content of the lotus, comminuted to a size so that all of said particle pass through a screen of 0.02 inch mesh, wherein said flour has a moisture content of less than 20% by weight.

4,929,468

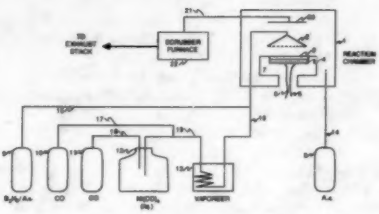
FORMATION OF AMORPHOUS METAL ALLOYS BY CHEMICAL VAPOR DEPOSITION

Arthur W. Mullendore, Sandia Park, N. Mex., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Mar. 18, 1988, Ser. No. 170,228

Int. Cl.[5] B05D *3/14*; C23C *16/18*

U.S. Cl. 427—47 **14 Claims**



1. A method of forming amorphous alloy deposite on heated surfaces by thermal dissociation of various mixtures of organometallic compounds, and metalloid hydrides in a neutral or reducing diluent gas atmosphere at temperatures ranging from about 20 to about 500° C., wherein the temperature selected for the dissociation is lower than the crystallization temperature of the alloy produced.

4,929,469

METHOD OF FORMING A TENTATIVE SURFACE PROTECTIVE COATING

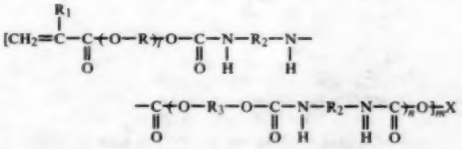
Tetsuya Kimura; Toshihiro Fujii, and Hiroki Nii, all of Fukuyama, Japan, assignors to Hayakawa Rubber Co., Ltd., Japan

Filed Jul. 6, 1988, Ser. No. 215,564

Int. Cl.[5] B05D *3/06*

U.S. Cl. 427—54.1 **7 Claims**

1. A method of forming a temporary surface protective coating on a surface of a substance before treating the surface by any of electrolytic plating, electroless plating, or a soldering treatment, comprising preparing a solventless or solvent free type screen ink essentially based on an ultraviolet ray-curable rubber copolymer obtained by polymerizing 100 parts by weight of a liquidus dienic rubber having at least one hydroxyl group and a M.W. of 1,000–10,000, 5–190 parts by weight of a diisocyanate compound, 1–90 parts by weight of a dihydric alcohol having a M.W. of not more than 300, and 2–25 parts by weight of an ethylenically unsaturated monomer having at least one hydroxyl group; the ultraviolet ray-curable rubber copolymer having a formula:



wherein R is an alkylene group having 2–8 carbon atoms, R_1 is H or CH_3, R_2 is a residue of diisocyanate, R_3 is a residue of dihydric alcohol from which at least one hydroxyl group is removed, X is a liquidus dienic rubber having one or more hydroxyl groups from which at least one hydroxyl group is removed, l is an integer of 1–4, n is an integer of 1–12, and m

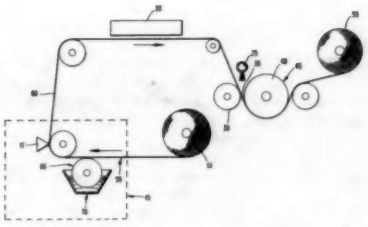
is a number of $1<m<3$, applying a coating of the ink on the surface of the substance by screen printing or thin film coating, and curing the coating of ink by irradiation with ultraviolet rays to form the temporary surface protective coating.

4,929,470

METHOD OF MAKING DECORATIVE CAST-COATED PAPER

David A. Rittenbouse, Midlothian; Fred Neurohr, Richmond, and Doug R. Estridge, Midlothian, all of Va., assignors to James River Corporation, Richmond, Va.

Filed Feb. 24, 1989, Ser. No. 315,159
Int. Cl.[5] B05D *3/06*
U.S. Cl. 427—55 **16 Claims**



1. A method for making a decorative cast-coated paper including particulate matter in the coating, comprising the steps of:

preparing a coating including an effective amount of particulate matter selected from the group consisting of flock, fiber, and metal flake;

coating a paper web with the coating; and

casting the coating by passing the coated paper around a casting drum.

8. The method of claim 2, wherein a heating means is used to gel the coating.

9. The method of claim 8, wherein the heating means comprises an infrared heater.

4,929,471

METHOD OF TREATING POLYESTER FABRIC

Howard Groelinger, Massapequa Park, N.Y., assignor to The Balson-Hercules Group Ltd., Pawtucket, R.I.

Filed Apr. 13, 1989, Ser. No. 338,231
Int. Cl.[5] B05D *3/02, 3/12*
U.S. Cl. 427—173 **8 Claims**

1. A method of treating a polyester fabric comprising the steps of:

a. exposing said fabric to a solution comprising between approximately 0.5% and 2% by weight of a wetting agent, 4% and 16% by weight of nonionic fluorocarbon long chain polymer, 1% and 6% by weight of nonionic, cationic or anionic nonsilicone based softener, 1% and 10% by weight of gum and 66% and 93½by weight of a carrier, the nonionic fluorocarbon long chain polymer comprising a copolymer of at least 25% by weight of a fluoroalkyl monomer and an alkylvinyl ether having the formula CH_2=CH-OR wherein R represents a halogen substituted lower alkyl group, the carrier being selected from a group consisting of water, water plus a water soluble organic solvent, and a water soluble organic solvent wherein the water soluble organic solvent is of a type which can be volatilized at a temperature below 360° F. without leaving a significant residue and also of a type which can be mixed with the nonionic fluorocarbon long chain polymer without reacting therewith;

b. heating said fabric to a temperature sufficient to evaporate substantially all of the carrier thereon;

c. heating said fabric from which the carrier has been evaporated to a temperature of between 360° F. and 440° F. to effect curing of said fabric and the remaining components of said solution thereon; and

d. applying between approximately 0.5 lbs. per linear in. and 2.0 lbs. per linear in. of tension to said fabric in both longitudinal and transverse directions.

4,929,472

SURFACE-COATED SIC WHISKERS, PROCESSES FOR PREPARING THE SAME, CERAMIC REINFORCED WITH THE SAME, AND PROCESS FOR PREPARING SAID REINFORCED CERAMIC

Kanji Sugihara; Motohiro Yamamoto; Tohru Kida, and Minoru Fukazawa, all of Gotenba, Japan, assignors to Tokai Carbon Co., Ltd., Tokyo, Japan

Filed May 31, 1988, Ser. No. 200,265
Claims priority, application Japan, Jun. 26, 1987, 62-157520; Oct. 20, 1987, 62-271644
Int. Cl.[5] B05D *3/02*
U.S. Cl. 427—215 **6 Claims**

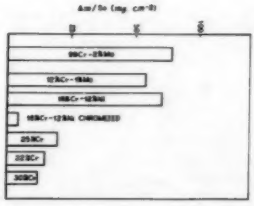
1. A process for preparing surface-coated SiC whiskers comprising the steps of dissolving a thermosetting resin in an organic solvent to prepare a perfect solution, dispersing SiC whiskers in said perfect solution, separating the SiC whiskers by filtration and drying it to remove said organic solvent, heating the whiskers coated with said thermosetting resin to cure said thermosetting resin, firing the whiskers coated with the cured thermosetting resin in a non-oxidizing atmosphere at 800 to 1,600° C. to carbonize said cured thermosetting resin to thereby form thin carbonaceous layers on the surfaces of said SiC whiskers.

4,929,473

CORROSION RESISTANCE OF LOW CARBON STEELS IN A VANADIUM, SULFUR AND SODIUM ENVIRONMENT AT HIGH TEMPERATURES

Edmundo M. Marquez, Caracas, Venezuela; Jean-Francois Nowak, Etienne, France, and Antonio Robles, Miranda, Venezuela, assignors to Intevep, S. A., Caracas, Venezuela

Continuation of Ser. No. 79,693, Jul. 30, 1987, abandoned. This application May 8, 1989, Ser. No. 349,951
Int. Cl.[5] C23C *11/04*
U.S. Cl. 427—252 **7 Claims**



1. A process for improving the corrosion resistance of iron alloys having a low carbon content to be used in a high temperature environment containing vanadium, sulfur and sodium, said process comprising:

providing an article formed from an iron alloy containing less than about 0.25% carbon; and

forming a diffusion coating containing aluminum and chromium on at least one surface of said element, said coating forming step comprising initially forming an aluminum diffusion coating on said at least one surface at a temperature of from about 700° C. to about 1150° C. and subse-

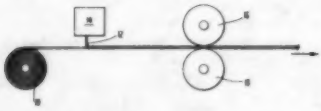
quently converting said coating into said coating containing aluminum and chromium by the diffusion of chromium at a temperature of greater than about 900° C.

4,929,474

METHOD OF MAKING HIGH QUALITY EXTRUSION COATED PAPER FOR QUALITY PRINTING

Eitan Avni; Simon Salama, both of Monroe, N.Y., and Eran Turi, Springfield, Mass., assignors to Union Camp Corporation, Wayne, N.J.

Filed Apr. 3, 1989, Ser. No. 333,163
Int. Cl.[5] B29C *47/06;* B32B *27/10*
U.S. Cl. 427—326 11 Claims



1. A process of manufacturing a polyolefin coated paper substrate having high quality printing thereon, said process comprising the steps of:

providing a highly smooth base sheet of paper;

extruding a coat of polyolefin on at least one side of the base sheet;

pressing the coat of polyolefin and the base sheet together by passing them through a nip of a pair of cooperating rollers wherein at least one of said pair of rollers is a low-friction chill roller which contacts the polyolefin coating for reducing a plurality of surface defects in said polyolefin coating which are of a size equal to or greater than a dot element of print; and

printing on said polyolefin coating.

4,929,475

NOVEL STOVING LACQUERS AND THEIR USE

Hendrikus de Jong, Maasdam, Netherlands, assignor to Hunter Douglas International N.V., Curacao, Netherlands

Continuation of Ser. No. 169,717, Mar. 18, 1988, abandoned.
This application Aug. 28, 1989, Ser. No. 399,363
Claims priority, application United Kingdom, Mar. 18, 1987, 8706362
Int. Cl.[5] B05D *3/02*
U.S. Cl. 427—407.1 8 Claims

1. A process for producing a stoved lacquer layer having a metallic-lacquer appearance which comprises:

selecting a stoving lacquer composition comprising a stovable transparent film-forming binder composition having dispersed therein transparent thermoplastic particles, wherein one of said binder composition or said particles is substantially colorless and the other is colored by transparent pigments, said particles being selected to be insoluble in the binder composition, to have a melting point which allows the particles after stoving to appear in the stoved lacquer in one of an independent, agglomerated or interfused but otherwise non-melted state, to have a general particle size within a range of 2 to 50 micrometers, and to have a volume ratio of binder/particles and a particle size within the said range so that, after stoving, the particles do not substantially protrude from the surface of the stoved lacquer layer and a predetermined "metallic effect" can be obtained;

applying said stoving lacquer composition to a reflective surface of a stoving-heat-resistant material having one or more reflective surfaces; and

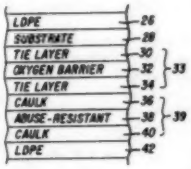
forming substantially colorless transparent zones through the thickness of the stoved lacquer layer, and forming colorless transparent zones extending only partly through the said layer, which zones appear as randomly distributed minute "windows" in the lacquer layer, by stoving the lacquer under controlled conditions with respect to curing temperature and curing time thereby effectuating a specific predetermined particle-flow and particle-agglomeration to produce a stove lacquer layer having a predetermined optical "metallic lacquer" effect wherein the particles do not substantially protrude from the surface of the stoved lacquer layer.

4,929,476

OXYGEN IMPERMEABLE LEAK FREE CONTAINER

Charles E. Gibbons; Gerald A. Marano; James M. Kittrell; Allan A. Whillock; Robert L. Lanham, all of Mobile, and Donald Evans, South Mobile, all of Ala., assignors to International Paper Company, Purchase, N.Y.

Filed May 22, 1989, Ser. No. 354,570
The portion of the term of this patent subsequent to Feb. 5, 2090, has been disclaimed.
Int. Cl.[5] B65D *5/56;* B32B *27/10*
U.S. Cl. 428—34.2 27 Claims



1. An oxygen barrier laminate structure for producing an oxygen impermeable leak free container comprising:

(a) a mechanically stable structural substrate having an inner and an outer surface;

(b) an outer layer of a heat-sealable polymer material coated on the outer surface of said mechanically stable structural substrate;

(c) a first inner sandwich layer of: a first adhesive tie layer, an oxygen barrier material layer, a second adhesive tie layer, all coated in the sequence listed on the inner surface of said mechanically stable structural substrate;

(d) a second inner sandwich layer of: a first caulking polymer resin layer, an abuse-resistant polymer resin layer, a second caulking polymer resin layer, all coated in the sequence listed on the inner surface of the second adhesive tie layer of the first inner sandwich layer, and;

(e) an inner heat-sealable product contact polymer material layer of low density polyethylene polymer extrusion coated on said inner surface of said second caulking polymer resin layer of said second inner sandwich layer, which is heat-sealable with the outer layer of polymer material on conventional equipment at temperatures ranging from 250° F. to 500° F. and wherein said first and second caulking polymer resins are selected from the group consisting of zinc salts of ethylene methacrylic acid copolymers, sodium salts of ethylene methacrylic acid copolymers, ethylene acrylic acid copolymers, ethylene methacrylic acid copolymers, ethylene vinyl acetate copolymers, ethylene methacrylate copolymers, and ethylene based graft copolymers.

4,929,477

HEAT-SHRINKABLE SLEEVE AND THE PROCESS FOR THE PRODUCTION THEREOF

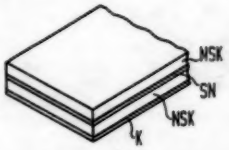
Horst Will, Hagen, Fed. Rep. of Germany, assignor to Firma RXS Schrumpftechnik-Garnituren GmbH, Fed. Rep. of Germany

Filed Jul. 8, 1988, Ser. No. 216,513

Claims priority, application Fed. Rep. of Germany, Jul. 15, 1987, 3723396

Int. Cl.[5] B27N *5/02*

U.S. Cl. 428—34.9 24 Claims



1. In a heat-shrinkable sleeve comprising a shrinkable component arranged with a non-shrinkable component, the improvements comprising the shrinkable component consisting of a cross-linked polymer having a shrinking temperature, said shrinkable component being elements in the form of an open grid with intersecting points of the elements forming grid cells of the grid being undetachably connected to one another at each point of intersection, said grid being embedded in the non-shrinkable component and being in a stretched condition, said non-shrinkable component being of a material that is softened at said shrinking temperature without melting and running.

4,929,478

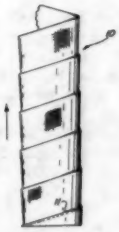
PROTECTIVE FABRIC SLEEVES

Thomas B. Conaghan, Rock Hall, Md.; Harry F. Gladfelter, Phoenixville, Pa.; Joseph S. Kite, III, West Chester, Pa., and Marie C. Tresslar, Plymouth Meeting, Pa., assignors to The Bentley-Harris Manufacturing Company, Lionville, Pa.

Filed Jun. 17, 1988, Ser. No. 208,305

Int. Cl.[5] F16L *11/00*

U.S. Cl. 428—35.1 12 Claims



1. An elongated fabric sleeve for the protection of conduit, cable or the like elongated substrate, said sleeve being formed of a resilient heat-settable ribbon comprised of interlaced plastic monofilament material characterized by an open construction, said monofilament material being heat settable to bias said sleeve into a tubular cross-sectional configuration with the side edges of the material being biased into a partial overlapping relationship throughout substantially the entire length thereof.

4,929,479

MEDICAL BAG

Kihachi Shishido; Masami Matsuoka, both of Yokohama; Noriyuki Ishihara, Amagasaki, and Masahiro Tamura, Kyoto, all of Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo and Fuso Pharmaceutical Industries, Ltd., Osaka, both of, Japan

Continuation of Ser. No. 82,915, Aug. 10, 1987, abandoned, which is a continuation of Ser. No. 535,117, Sep. 23, 1983, abandoned. This application May 24, 1988, Ser. No. 198,252

Int. Cl.[5] B65D *30/26, 85/00;* B32B *27/08, 27/32*

U.S. Cl. 428—35.2 6 Claims

1. A medical bag composed of a laminate having a total thickness of 0.15 to 0.6 mm comprising:

(i) an inner low-density polyethylene layer,

(ii) an intermediate layer having a thickness of 60% to 90% of the total thickness and composed of

(a) a non-hydrolyzed ethylene-vinyl acetate copolymer having a vinyl acetate content of 15% to 28% by weight;

(b) an ethylene-propylene type elastomer having a propylene content of 15 to 40 mole %, or

(c) an ethylene-butene-1 type elastomer having a butene-1 content of 8 to 20 mole %, and

(iii) an outer low-density polyethylene layer.

4,929,480

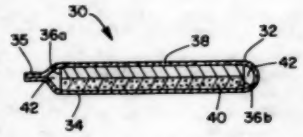
ABSORBENT STRUCTURE FOR ABSORBING FOOD PRODUCT LIQUIDS

David G. Midkiff, Alpharetta; Carl G. Rippl, Woodstock; Nancy D. Twyman, Norcross, and Joseph D. Wahlquist, Woodstock, all of Ga., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Filed Jul. 20, 1987, Ser. No. 75,382

Int. Cl.[5] B32B *15/16*

U.S. Cl. 428—35.6 5 Claims



1. An absorbent structure for collecting and retaining fluids released from foods comprising:

a fluid permeable top sheet,

a fluid impermeable bottom sheet, and

an absorbent inner core of pulp conform material positioned between and joined to said top and bottom sheets, said absorbent inner core containing between 50 and 90 percent by weight wood pulp fluff and between 10 and 50 percent by weight synthetic fibers based upon the combined weight of said wood pulp fluff and said synthetic fibers, said absorbent inner core being divided into a first layer adjacent said top sheet and a second layer adjacent said bottom sheet, said second layer having a higher synthetic fiber concentration than said first layer, said first layer being substantially devoid of a superabsorbent material and said second layer containing a superabsorbent material in a weight percent add on from 5 to 100 percent based upon the combined weight of said wood pulp fluff and said synthetic fibers in said second layer.

4,929,481

WEATHER STRIP FOR AUTOMOBILE

Tadanobu Iwasa, Ichinomiya, Japan, assignor to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Filed Jan. 24, 1989, Ser. No. 301,400

Claims priority, application Japan, Mar. 2, 1988, 63-049235; Mar. 2, 1988, 63-049236

Int. Cl.[5] B60J *1/20*; E06B *7/14*

U.S. Cl. 428—36.1 **15 Claims**

1. A weather strip for use in an automobile, characterized by the fact that the main body thereof is provided in the portion thereof destined to contact such sheet metal parts as a body flange and a sash with a strip of rustproofing agent retaining member comprising a core, a core coating layer, and a surface layer, said core is formed of a fabric impregnated with rustproofing agents, the amount of said rustproofing agents is in the range of 0.1 to 1 g per cm^2 of the fabric being impregnated, said core coating layer is formed of a water-diffusing material, and said surface layer is formed with a flexible planar material, and said planar material is furnished at least on the side thereof contiguous to said sheet metal parts with a water-permeating texture.

4,929,482

HEAT RESISTANT CONTAINER

Tohei Moritani; Hidemasa Oda; Toshiaki Sato; Taichi Negi; Keiji Matsumura; Syuji Kawai, all of Kurashiki; Nobuo Tasaka, Nishinomiya, and Satoshi Hirofuji, Kurashiki, all of Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

Filed Jul. 14, 1988, Ser. No. 219,113

Claims priority, application Japan, Jul. 23, 1987, 62-184959

Int. Cl.[5] B65D *81/26*

U.S. Cl. 428—36.4 **13 Claims**

1. A heat resistant container suitable for retort treatment and ovenability comprising an ethylene-vinyl alcohol copolymer layer containing a drying agent and a crystalline polyester resin layer, said crystalline polyester resin layer comprising a thermoplastic polyester and a crystallization accelerator consisting essentially of a polyolefin.

4,929,483

METHOD OF REINFORCING SHEET METAL PANELS, SHAPED PLASTIC PANELS OR THE LIKE AND A STIFFENING MEMBER USABLE FOR PERFORMING THE METHOD

Paul Hälg, Richterswil, and Paul Rohrer, Herrliberg, both of Switzerland, assignors to Gurit-Essex AG, Freienbach, Switzerland

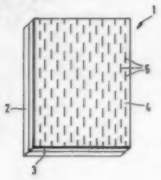
Filed Jun. 10, 1988, Ser. No. 205,314

Claims priority, application Fed. Rep. of Germany, Jun. 19, 1987, 3720267; Switzerland, Jun. 6, 1988, 2155/88

Int. Cl.[5] B32B *3/00*

U.S. Cl. 428—47 **46 Claims**

1. An essentially flat stiffening member for the reinforcement of a panel, comprising a first layer containing a thermosetting resin provided with reinforcing means, and a second layer containing a sticky thermosetting resin, said second layer being covered by a foil shrinking under the influence of heat and essentially freely exposing said second layer upon shrinking to



render one surface of said stiffening member sticky upon having been subjected to a heat treatment.

4,929,484

FILLING MATERIAL FOR PERCOLATING FILTERS FOR THE TREATMENT OF LIQUIDS AND PROCESS FOR PRODUCING AND ASSEMBLING IT

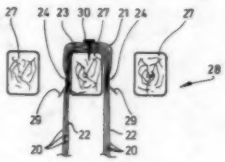
Hartwig Basse, Nordenham, Fed. Rep. of Germany, assignor to Norddeutsche Seekabelwerke AG, Nordenham, Fed. Rep. of Germany

Filed Dec. 4, 1987, Ser. No. 128,845

Claims priority, application Fed. Rep. of Germany, Dec. 9, 1986, 3641960

Int. Cl.[5] B01D *39/04*; C02F *3/04*

U.S. Cl. 428—53 **26 Claims**



1. Filling material for pe. colating filters for the treatment of liquids, especially for biological sewage purification, and which is adapted to be suspended on a supporting arrangement, said material comprising a plurality of plastic strips (**20**) and a single holding sheet (**21, 33**) which connects said strips (**20**) to one another, said holding sheet (**21, 33**) being directed transversely relative to said strips longitudinal direction.

4,929,485

INFORMATION STORAGE MEDIUM AND METHOD OF MANUFACTURING THE SAME

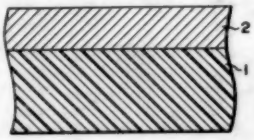
Hideki Ohkawa, Tokyo, and Norio Ozawa, Kawasaki, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 27, 1989, Ser. No. 302,680

Claims priority, application Japan, Feb. 1, 1988, 63-19684

Int. Cl.[5] B32B *3/02*

U.S. Cl. 428—64 **22 Claims**



1. An information storage medium comprising:

a substrate; and

a recording layer, provided on said substrate and containing carbon and M (M represents at least one type of element selected from the group consisting of a metal element, a semimetal element, and a semiconductor element),

said recording layer including an amorphous structure confirmed by X-ray diffractometry, and activation energy required to transform a state of said recording layer from said amorphous state into a crystalline state confirmed by X-ray diffractometry being not less than 1.5 eV.

4,929,486

COVER TAPE FOR SEALING CHIP-HOLDING PARTS OF CARRIER TAPE

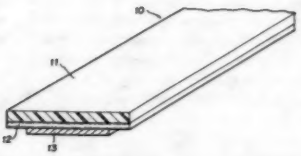
Kazumi Itou; Kazuyoshi Ebe, and Toshio Minagawa, all of Saitama, Japan, assignors to FSK Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 25, 1988, Ser. No. 224,016

Claims priority, application Japan, Jul. 24, 1987, 62-184985; Jul. 24, 1987, 62-184986

Int. Cl.[5] C09J *7/02*

U.S. Cl. 428—77 **4 Claims**



1. A cover tape for sealing chips in chip-holding parts of a carrier tape having said parts provided intermittently and longitudinally of said carrier tape, which cover tape comprises a base tape, an adhesive layer formed on only one surface of said base tape and a layer of non-adhesive radiation-cured or oxidation-cured ink pattern printed on said adhesive layer along the longitudinal direction of said base tape so that said non-adhesive layer has a width greater than that of the chips and less than that of said adhesive layer.

4,929,487

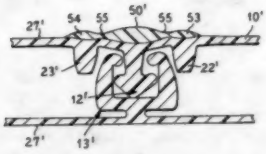
BAG MAKING MATERIAL HAVING FASTENER PROFILES AND ALIGNMENT RIBS WITH REINFORCING AND STABILIZING BEAM EFFECT RIDGE MEANS

Paul A. Tilman, New City; Zdenek Machacek, Nanuet, and Richmond Scott, Pleasantville, all of N.Y., assignors to Minigrip, Inc., Orangeburg, N.Y.

Division of Ser. No. 95,835, Sep. 14, 1987, Pat. No. 4,672,723. This application Dec. 12, 1988, Ser. No. 282,694

Int. Cl.[5] B32B *3/28*; B65D *33/16*; A41F *1/00*; A44B *1/04*

U.S. Cl. 428—163 **14 Claims**



1. Bag making material including film and a male zipper profile, comprising:

an extruded plastic film;

an elongated extruded plastic male zipper profile having a base attached to said film;

an extruded plastic alignment rib having a base attached to said film in adjacent spaced parallel relation to said male profile; and

a stabilizing ridge on said film along the back of said male profile base and extending at least partially onto the back of said rib base and having a stabilizing beam effect with respect to the relation of said male profile and alignment rib.

4,929,488

PIECE OF FURNITURE MADE OF GLASS AND THE LIKE HAVING A RESTING PROFILE MEMBER OF RUBBER

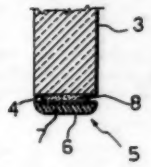
Vittorio Livi, Pesaro, Italy, assignor to FIAM S.r.l., Tavullia, Italy

Filed Jul. 29, 1988, Ser. No. 225,851

Claims priority, application Italy, Jul. 30, 1987, 22136/87[U]

Int. Cl.[5] B32B *3/00*

U.S. Cl. 428—192 **2 Claims**



1. An item of furniture comprising at least one glass leg having a flat resting edge, said flat resting edge being provided with a rubber strip having a metal foil embedded therein, said metal foil having a size equal to or smaller than that of the rubber strip, and an adhesive means attached to the metal foil and the resting edge for making the rubber strip unitary with the leg.

4,929,489

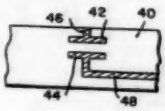
METHOD OF MAKING AND USING SELECTIVE CONDUCTIVE REGIONS IN DIAMOND LAYERS

Gisela A. M. Dreschhoff, and Edward J. Zeller, both of 2908 W. 19th St., Lawrence, Kans. 66044

Continuation of Ser. No. 75,393, Jul. 20, 1987, abandoned. This application Mar. 9, 1989, Ser. No. 321,219

Int. Cl.[5] B32B *9/00*

U.S. Cl. 428—195 **17 Claims**



1. An electrical device comprising:

a conductive region in a diamond lattice substrate including a zone of conductive graphite below the surface of the diamond lattice and formed by localized heating of the diamond substrate;

conductor contacts at the surface of said diamond substrate in current conducting communication with said conductive region; and

a source of potential connected to said conductor contacts.

4,929,490

WINDOW FRAME RUBBER MOLDINGS FOR AUTOMOBILE

Tadanobu Iwasa, Ichinomiya, Japan, assignor to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Filed Jan. 27, 1989, Ser. No. 302,265

Claims priority, application Japan, Mar. 18, 1988, 63-066530

Int. Cl.[5] B60J *1/20*; E06B *7/14*

U.S. Cl. 428—195 **2 Claims**

1. A window frame rubber molding for an automobile, comprising a main body incorporating therein an automobile body flange retaining groove and a glass retaining groove opening in mutually opposite directions and possessing an approximately S-shaped cross section, which window frame rubber molding is characterized by the fact that said flange retaining groove is provided in the bottom wall thereof with a strand retaining groove converted in the direction of the opening thereof and said strand retaining groove has fitted therein a strand impregnated with rustproofing agents, the amount of said rustproofing agents to be used for the impregnation of said strand being in the range of 0.1 to 20 g per 100 g of the matrix of said strand.

4,929,491

PRINTED WIRING BOARD

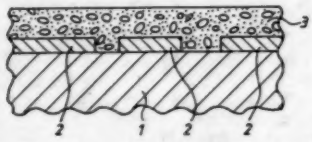
Shin Kawakami; Satoshi Haruyama, and Hirotaka Okonogi, all of Saitama, Japan, assignors to Nippon CMK Corp., Japan

Filed Nov. 1, 1988, Ser. No. 265,688

Claims priority, application Japan, Jun. 16, 1988, 63-148933; Jun. 16, 1988, 63-148934

Int. Cl.[5] B32B *9/00*

U.S. Cl. 428—195 **12 Claims**



6. A printed wiring board according to claim 4; wherein the solder resist film-forming ink contains a foam control agent.

4,929,492

STRETCHABLE INSULATING FABRIC

Patrick H. Carey, Jr., and Charles D. Cowman, Jr., both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 77,438, Jul. 24, 1987, abandoned. This application Feb. 14, 1989, Ser. No. 312,334

Int. Cl.[5] B32B *3/00*

U.S. Cl. 428—198 **21 Claims**

1. An elastically stretchable fabric having enhanced thermal insulation properties comprising at least one elastically stretchable fibrous carrier web having substantially uniform stretch properties and that may be repeatedly stretched and yet return to its original dimensions; and, as a separate layer different in composition from the carrier web, a thin coherent layer of blown microfibers averaging less than 10 micrometers in diameter coated on at least one surface of the carrier web, the layer of microfibers having an average weight of less than about 30 g/m^2 and being deposited on the carrier web and mechanically intertwined with the fibers of the carrier web.

4,929,493

METHOD OF APPLYING A COLORATION COATING TO A GLASS PANE

Gerhard Tünker, Duisburg, Fed. Rep. of Germany, assignor to Flachglas Aktiengesellschaft, Furth, Fed. Rep. of Germany

Filed Jul. 21, 1988, Ser. No. 222,473

Claims priority, application Fed. Rep. of Germany, Jul. 21, 1987, 3724013

Int. Cl.[5] B32B *3/00*

U.S. Cl. 428—207 **13 Claims**

1. A method of applying a coloration coating to a glass pane, comprising the steps of:

(a) forming a screen-applicable glass-frit-free coating composition of a flowable consistency from at least one flake-form or platelet-form inorganic pigment selected from the group which consists of lamellar silicates, oxides, metals, carbon and mixtures thereof in a particle size less than 40 μm, and an aluminum phosphate solution binder, said aluminum phosphate solution binder being a 50% aqueous solution containing aluminum measured as Al_2O_3 and phosphate measured as P_2O_5 in a ratio P_2O_5/Al_2O_3 of substantially 5.3 to 3.7 and is present in said composition in an amount of 15 to 20 percent by weight in terms of solids of the solution;

(b) screening said composition onto a glass pane to form a coating of said composition on at least a limited area of a surface of said pane; and

(c) thereafter firing the glass pane with said coating thereon at a temperature of substantially 550° C. to 700° C. to burn said coating onto said pane.

13. A coated automotive-vehicle glass pane made by the method of claim 1.

4,929,494

FIBROUS SUBSTRATES IMPREGNATED WITH A CURABLE COMPOSITION

Fumio Matsui; Noboru Suzuki, both of Kanagawa; Minoru Takaishi, Tokyo; Ryushi Ogura, Gunma; Noriaki Harigai, Saitama; Tadayoshi Hashimoto, and Tomoe Uematu, both of Kanagawa, all of Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 6, 1987, Ser. No. 117,605

Claims priority, application Japan, Mar. 5, 1986, 61-48902; Nov. 7, 1986, 61-266129; Nov. 7, 1986, 61-266121; Nov. 13, 1986, 61-270071; Nov. 13, 1986, 61-270069; Nov. 14, 1986, 61-272441; Mar. 5, 1987, 62-48903; Mar. 5, 1987, 62-48904; Apr. 16, 1987, 62-92035; Apr. 16, 1987, 62-92036; Aug. 13, 1987, 62-200895; Aug. 13, 1987, 62-200896; Aug. 13, 1987, 62-200897; Aug. 13, 1987, 62-200898

Int. Cl.[5] B32B *27/00, 27/38*

U.S. Cl. 428—286 **23 Claims**

1. A laminate comprising fibrous substrates which are impregnated with a curable composition, laminated and cured, the curable composition comprising,

(i) a curable prepolymer having a main chain consisting essentially of a random copolymer of a vinyl monomer and an acrylic or methacrylic monomer, and a side chain containing an acryloyl or methacryloyl group at the terminal, as a main component, and

(ii) a crosslinkable vinyl monomer.

4,929,495

NONWOVEN FABRIC COATED WITH CARBOXYLATED ACRYLATE POLYMERS, AND PROCESS FOR MAKING THE NONWOVEN FABRIC

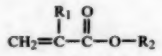
Vic Stanislawczyk, North Ridgeville, Ohio, assignor to The B.F. Goodrich Company, Akron, Ohio

Continuation-in-part of Ser. No. 921,165, Oct. 20, 1986, abandoned. This application Apr. 13, 1989, Ser. No. 337,516

Int. Cl.[5] **B05D** *3/02;* **B32B** *27/10, 27/12, 27/30;* **D04H** *1/64*

U.S. Cl. 428—288 **23 Claims**

1. A nonwoven fibrous material comprising fibers bonded together with a binder consisting essentially of predominantly acrylate-containing, crosslinked polymer chains including repeating units derived from itaconic acid and an acrylate represented by the structure



(I)

wherein

R_1 is hydrogen or methyl;

R_2 represents C_1–C_{20} alkyl, $C_2$14 C_7 alkokyalkyl, $C_2$14 C_7 alkylthioalkyl, or $C_2$14 C_7 cyanoalkyl;

said crosslinking is effected by a crosslinking monomer present in an amount in the range from 0.1 phr to 20 phr;

said itaconic acid is present in the range from about 1 phr to about 20 phr;

at least 40 phr of said acrylate in said polymer is present as an alkyl acrylate in which alkyl is $C_4$14 C_8; said polymer in the aqueous emulsion form as suitably applied in the fabric had a concentration of at least 5 COOH groups/nm^2 of surface, near the surface of the latex particles of the emulsion, a T_g in the range from −20° C. to −60° C.; and, said non-woven fibrous material is characterized by being substantially non-blocking at ambient temperature and pressure of about 689 kPa (100 psig) and by 70% recovery upon releasing said material from under 100 psi pressure exerted for 15 min on said fabric maintained at 49° C. (120° F.).

4,929,496

ELECTROCONDUCTIVE THERMOPLASTIC RESIN MOLDED PRODUCT

Takashi Daimon; Hideshi Sakamoto, and Osamu Akimoto, all of Ichihara, Japan, assignors to Chisso Corporation, Japan

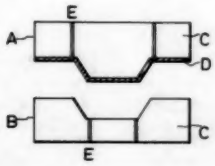
Filed Dec. 30, 1988, Ser. No. 291,958

Claims priority, application Japan, Jan. 5, 1988, 63-543; Mar. 14, 1988, 63-59795

The portion of the term of this patent subsequent to Jan. 2, 2007, has been disclaimed.

Int. Cl.[5] **B32B** *7/00*

U.S. Cl. 428—246 **12 Claims**



1. An electroconductive thermoplastic resin molded product comprising

(a) an electroconductive thermoplastic resin sheet including a thermoplastic resin film;

(b) a non-woven fabric consisting of hot-melt-adhesive fibers and electroconductive fibers irregularly entangled with each other and applied and integrally melt-adhered to one or both surfaces of said film and then subjected to surface treatment; and

(c) a coating having a curing composition composed mainly of an unsaturated resin and a reactive diluent applied to the treated surface and crosslinked and cured and having a coating thickness of 1 to 10 μm,

said electroconductive thermoplastic resin sheet being fixed between a pair of male and female molds at least one surface of which has a heat-resistant rubber thereat and molded between the molds to each other.

4,929,497

FLAME RETARDANT ROLLING DOOR

Larry L. Mitchell, Homer, and Crayton G. Toney, McGraw, both of N.Y., assignors to Albany International Corp., Menands, N.Y.

Filed Mar. 27, 1989, Ser. No. 329,020

Int. Cl.[5] **B32B** *7/00, 25/00*

U.S. Cl. 428—265 **20 Claims**

1. A flame-retardant rolling-door panel comprising:

a flame-retardant base fabric, said base fabric woven from a monofilament yarn, said monofilament yarn extruded from a mixture of a thermoplastic material and a flame-retardant additive; and

a flame-retardant coating agent applied to the surface of said base fabric.

4,929,498

ENGINEERED-PULP WET WIPER FABRIC

Stuart P. Suskind, Greer, and Joseph H. Miller, Greenville, both of S.C., assignors to James River Corporation of Virginia, Norwalk, Conn.

Filed Jan. 31, 1989, Ser. No. 304,981

Int. Cl.[5] **A01N** *25/34;* **A61F** *13/15;* **A61L** *15/46;* **D21H** *11/16, 21/36*

U.S. Cl. 428—288 **18 Claims**

1. An antimicrobially-active nonwoven fabric suitable for use as a wet wiper that comprises fibers and an antimicrobial agent distributed on from 10% through 50% of said fibers, said antimicrobial agent being substantive to said fibers such that said antimicrobial agent is substantially prevented from diffusing from said fabric.

4,929,499

USE OF NICKEL-PHOSPHOROUS UNDERCOAT FOR PARTICULATE MEDIA IN MAGNETIC STORAGE DEVICES

Bahram Shadzi, and Christopher A. Weaver, both of Omaha, Nebr., assignors to Magnetic Peripherals Inc., Minnetonka, Minn.

Division of Ser. No. 183,863, Apr. 20, 1988, abandoned. This application Jul. 17, 1989, Ser. No. 380,758

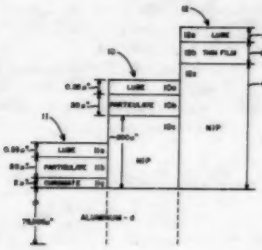
Int. Cl.[5] **G11B** *5/66*

U.S. Cl. 428—336 **4 Claims**

1. Apparatus comprising:

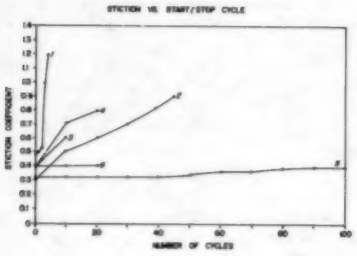
a substrate:

a first layer electrolessly plated onto said substrate comprising nickel and phosphorous, and



a second layer of particulate magnetic media spin-coated onto said first layer; said particulate magnetic media comprising magnetic particles suspended in a binder.

4,929,500
CORROSION RESISTANT MAGNETIC DISK
Tsutomu T. Yamashita; Ching-Cheng Shir, both of San Jose, and Tu Chen, Saratoga, all of Calif., assignors to Komag, Inc., Milpitas, Calif.
Filed Apr. 3, 1986, Ser. No. 847,990
Int. Cl.[5] G11B *5/72*
U.S. Cl. 428—336 **15 Claims**

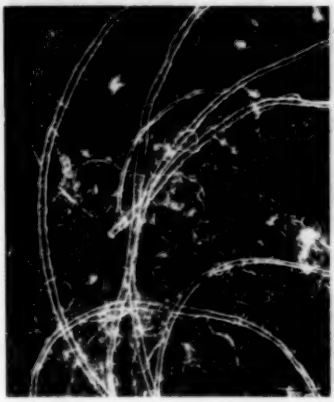


1. A hard magnetic disk for use in magnetic induction recording comprising:
a nonmagnetic substrate;
a magnetic film of recording media formed on said substrate; and
a protective layer formed above said film, said protective layer comprising sputtered ZrO_2 and a stabilizer, said protective layer being the uppermost vacuum-deposited layer on said disk and being substantially free of other vacuum-deposited solid lubricants.

4,929,501
THERMAL TRANSFER MEDIUM
Takuji Okada, and Kunio Murakami, both of Uji, Japan, assignors to Stamicarbon B.V., Geleen, Netherlands
Filed Aug. 17, 1988, Ser. No. 233,125
Claims priority, application Japan, Aug. 18, 1987, 62-206140
Int. Cl.[5] B41M *5/035, 5/26*
U.S. Cl. 428—337 **8 Claims**

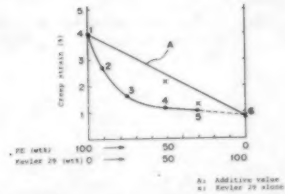
1. Thermal transfer medium which has a heat-meltable or heat-sublimable ink layer on one side of a polymer film, wherein the film comprises at least one layer consisting of polytetramethylene adipamide homopolymer, a polyamide blend containing at least 60% by weight polytetramethylene adipamide or a copolyamide containing at least 60% by weight tetramethylene adipamide units, the polyamide containing layer having a melting point of at least 270° C.

4,929,502
FIBRILLATED FIBERS AND ARTICLES MADE THEREFROM
Robert D. Giglia, Rye, N.Y., assignor to American Cyanamid Company, Stamford, Conn.
Filed Oct. 14, 1986, Ser. No. 918,246
Int. Cl.[5] D02G *3/00*
U.S. Cl. 428—357 **15 Claims**



1. A fibrillated monoethylenically unsaturated monomer based fiber wherein said fiber has a Canadian Standard Freeness of less than 100 in combination with a Tensile Strength of at least 5 pounds per inch.

4,929,503
COMPOSITE FIBROUS MATERIAL
Yoshikazu Shirasaki, and Yoshio Tadokoro, both of Shiga, Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan
Filed Dec. 18, 1986, Ser. No. 943,002
Claims priority, application Japan, Dec. 19, 1985, 60-286750
Int. Cl.[5] D02G *3/00*
U.S. Cl. 428—373 **24 Claims**



1. A bundle of fibers which comprises 50 to 95% by weight of (A) polyethylene fibers having a tenacity of at least 20 g/denier and a tensile modulus of at least 500 g/denier, 5 to 50% by weight of (B) all aromatic polyamide fibers and (C) all aromatic polyester fibers, wherein the all aromatic polyamide fibers (B) and the all aromatic polyester fibers (C) have a tenacity of at least 15 g/denier and a tensile modulus of at least 500 g/denier.

6. A bundle of fibers which comprises 50 to 95% by weight of (A) polyethylene fibers having a tenacity of at least 20 g/denier and a tensile modulus of at least 500 g/denier and 5 to 50% by weight of (C) all aromatic polyester fibers, wherein the all aromatic polyester fibers (C) have a tenacity of at least 15 g/denier and a tensile modulus of at least 500 g/denier.

4,929,504
ETHER SULFONATES AS ANTISTATIC AGENTS

Rudolf Veitenhansl, Haan; Wolfgang Froeschke, Wuppertal, and Robert Piorr, Ratingen-Hoesel, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Division of Ser. No. 772,836, Sep. 5, 1985, Pat. No. 4,826,998. This application Feb. 3, 1989, Ser. No. 306,377

Claims priority, application Fed. Rep. of Germany, Sep. 29, 1984, 3435841

Int. Cl.[5] B32B *27/34*

U.S. Cl. 428—395 **20 Claims**

1. A process for controlling static on plastic surfaces comprising applying to a plastic surface an antistatic quantity of a water-soluble sulfonic acid salt of the formula:

$$Y^{(+m)}(^{\ominus}O_3S—R^3—O(C_nH_{2n}O)_x—R^1)_m \quad (IV)$$

wherein m is 1 or 2, R^3 is a C_{10}–C_{22} alkenylene, hydroxyalkylene, or hydroxyalkenylene group, R^1 is a C_1–C_{12} alkyl group, n is an integer of from 2 to 4, x is an integer of from 0 to 35, and y is an alkali metal cation, an alkaline earth metal cation, the ammonium cation or a C_2–C_9 alkanolammonium cation.

10. A process in accordance with claim 1 wherein the plastic surface is the surface of a synthetic fiber.

11. A process in accordance with claim 10 wherein the synthetic fiber is a polyamide fiber.

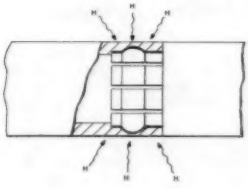
4,929,505
CARBON-CARBON COMPOSITE STRUCTURAL ASSEMBLIES AND METHODS OF MAKING THE SAME

Robert M. Washburn, Santa Clara, and Jerry D. Dodson, Fremont, both of Calif., assignors to Acurex Corporation, Mt. View, Calif.

Filed Dec. 30, 1986, Ser. No. 947,760

Int. Cl.[5] B32B *9/00*

U.S. Cl. 728—408 **34 Claims**



15. A structural assembly, comprising:

(a) first and second carbon-carbon composite structures having predetermined first and second surface segments, respectively, at least one of said surface segments being sufficiently resilient such that said surface segments engage one another in a compression fitted manner without the aid of external forces, whereby to hold said structures together; and

(b) a layer of charred material disposed between said surface segments for fixedly connecting said composite structures together, said charred material being the result of coating a char forming but uncharred material over at least one of said surface segments prior to engaging said surface segments to one another and after so engaging these surface segments subjecting the coated char forming material to a heated environment sufficient to char the material.

4,929,506
COATED POLYCARBONATE ARTICLES

Stuart R. Kerr, III, Evansville, and James E. Moore, Mt. Vernon, both of Ind., assignors to General Electric Company, Pittsfield, Mass.

Filed Dec. 31, 1987, Ser. No. 140,084

Int. Cl.[5] B32B *27/36;* **B29D** *11/00*

U.S. Cl. 428—412 **16 Claims**

1. A polycarbonate article is coated with the photoreaction product of a composition, said composition consisting essentially of:

(a) from 50% by weight to 90% by weight of an acrylated urethane oligomer, which has a molecular weight of from about 800 to about 50,000 and a degree of functionality of from 1 to about 4;

(b) from 10% by weight to about 50% by weight of a difunctional acrylate monomer; and

(c) a photosensitizing amount of a photosensitizer;

wherein relative proportions of the acrylated urethane oligomer and the difunctional acrylate monomer are such as to provide a flexible, thermoformable cured coating.

4,929,507
HEAT-RESISTANT PAINT COMPRISING POLYMETALLOCARBOSILANE

Yoshio Nishihara, Ube; Noriyuki Isobe, Kyoto, and Satoshi Kotera, Ube, all of Japan, assignors to Ube Industries, Ltd., Ube, Japan

Continuation of Ser. No. 900,381, Aug. 26, 1986, abandoned. This application Mar. 23, 1988, Ser. No. 172,962

Claims priority, application Japan, Aug. 27, 1985, 60-186591; Sep. 4, 1985, 60-193786

The portion of the term of this patent subsequent to Feb. 28, 2006, has been disclaimed.

Int. Cl.[5] C08K *3/00, 3/14, 3/38*

U.S. Cl. 428—447 **8 Claims**

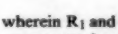
1. A heat-resistant paint comprising a dispersion or solution of a polymetallocarbosilane and an inorganic filter in an organic solvent,

wherein said polymetallocarbosilane is an organometallic polymer having a number average molecular weight of 400 to 50,000 comprising

(A) carbosilane bond units of the formula

wherein R_1 and R_2 may be identical or different and each represents a lower alkyl group, a phenyl group or a hydrogen atom, and

(B) metalloxane bond units of the formula



wherein M represents at least one element selected from the group consisting of Ti, Zr, Cr and Mo, and optionally at least a part of each of the above elements has at least one lower alkoxy group or a phenoxy group as a side-chain group, in which the bond units (A) and (B) are bonded at random in the main-chain skeleton, and/or at least one of the silicon atoms of the bond units (A) is bonded to each of the above elements of the bond units (B) via an oxygen atom, whereby the polycarbosilane portion obtained by chaining of the bond units (A) is crosslinked with the bond units (B), and in which the ratio of the total number of the bond units (A) to the total number of bond units (B) is in the range of from 1:1 to 10:1;

wherein said inorganic filter is at least one material selected from the group consisting of oxides, borates, phosphates, silicates, silicides, borides, nitrides and carbides: and

wherein said inorganic filler is present is an amount of 10 to 900 parts by weight per 100 parts by weight of said polymetallocarbosilane.

4,929,508

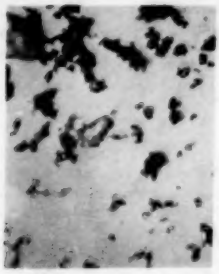
NOVEL DRUG DELIVERY SYSTEM FOR ANTITUSSIVES

Shri C. Sharma, Meadham; James J. Shaw, Morristown, and Robert K. Yang, Morris Plains, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 701,470, Feb. 14, 1985, Pat. No. 4,797,288, which is a continuation-in-part of Ser. No. 658,101, Oct. 5, 1984, Pat. No. 4,752,485. This application Jul. 26, 1988, Ser. No. 224,601

Int. Cl.[5] A61K *47/00*

U.S. Cl. 424—439 **21 Claims**



1. A dry particulate drug delivery system designed to be chewed or swallowed whole comprising:

(A) an antitussive in an amount of about 1% to about 75%; and

(B) a hydrophobic matrix comprising

(i) about 0.5% to about 20% by weight of an emulsifier; and

(ii) about 61% to about 95% by weight of an edible material having a melting point in the range of about 25° C. to about 100° C. selected from the group consisting of (a) fatty acids having an iodine value of about 1 to about 10, (b) natural waxes, (c) synthetic waxes and (d) mixtures thereof; and

(iii) at least one glyceride, wherein the antitussive and hydrophobic matrix form an agglomerate, and

(C) a coating surrounding said agglomerate effective to delay hydration until ingested comprising about 200% to about 400% by weight of the agglomerate an edible material having a melting point in the range of about 25° C. to about 100° C. selected from the group consisting of (a) fatty acids having an iodine value of about 1 to about 10, (b) natural waxes, (c) synthetic waxes and (d) mixtures thereof; wherein the coating forms a protective barrier effective to prevent unpleasant taste perception for the antitussive agglomerate.

4,929,509

ADHESIVES BASED ON AMORPHOUS PROPYLENE/HEXENE COPOLYMERS

Darryl A. Godfrey, Longview, Tex., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 6, 1988, Ser. No. 215,681

Int. Cl.[5] B32B *15/08, 27/32, 21/08*; C08L *23/20*

U.S. Cl. 428—461 **26 Claims**

1. A hot-melt adhesive composition suitable for making a glue gun stick comprising a blend of:

(1) about 40 to 80 weight percent of an unmodified substantially amorphous propylene-hexene copolymer having a melt viscosity of about 2,000 to 30,000 cps at 190° C.; and an amount of 1-hexene of from about 6 to less than 15 mole percent; and

(2) about 60 to 20 weight percent of at least one compatible tackifying resin;

wherein said adhesive composition has substantially no amount of plasticizing oil, is non-tacky at room temperature, has a bond strength of at least about 150 pounds on oak and a time to bond failure greater than about 2 minutes using ASTM Procedure D-1002 with a tensile tester crosshead speed of 0.05 inches per minute; and a good to excellent bond flexure rating.

4,929,510

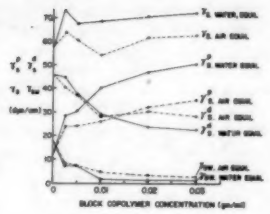
BIOCOMPATIBLE POLYMER ARTICLES

Eli Ruckenstein, Amherst, N.Y., and Dennis B. Chung, Upper Marlboro, Md., assignors to State University of New York, Albany, N.Y.

Filed Apr. 29, 1988, Ser. No. 187,731

Int. Cl.[5] B32B *27/30*

U.S. Cl. 428—520 **15 Claims**



1. A polymer article comprising

(a) a hydrophobic polymer substrate having a substrate surface; and

(b) a block copolymer having at least first and second blocks within each of the molecules of the block copolymer, the first block being more hydrophobic than the second block, the molecules of said block copolymer being secured into the surface of said substrate by means of the first block and at least a portion of the second block outwardly extending from the surface.

4,929,511

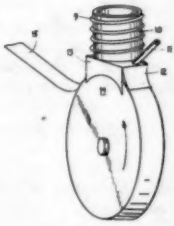
LOW TEMPERATURE ALUMINUM BASED BRAZING ALLOYS

Richard L. Bye, Jr., Morristown; Debasis Bose, Piscataway; Santosh K. Das, Randolph; Amitava Datta, Morris Township, Morris County, and Colin M. Adam, Morristown, all of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Division of Ser. No. 169,123, Mar. 9, 1988, Pat. No. 4,838,341. This application Aug. 1, 1988, Ser. No. 226,924

Int. Cl.[5] B23K *35/28*

U.S. Cl. 428—606 **3 Claims**



1. A rapidly solidified foil having a thickness ranging from about 25 μm to about 100 μm and a composition consisting

essentially of about 10 to 13 weight percent Si, 0 to 3 weight percent Mg, 0 to 4 weight percent Cu, 0 to 0.2 weight percent of at least one of Bi, P, Sr, Li, Sc, Y, Na, Ca, and 0 to 2 weight percent of at least one of the rare earth elements, the balance being aluminum and incidental impurities, said foil being capable of being bent to a round radius of about 0.16 cm without fracturing and having silicon particles distributed therethrough with an average silicon partcial size of less than 1 μm.

4,929,512

METAL AND COMPOSITE MATERIAL MADE OF THE METAL AND RUBBER

Yoshifumi Nishimura; Susumu Yamamoto; Hidekazu Nakata, all of Itami; Kiyoshige Muraoka, Kobe; Mamoru Uchida, Akashi, and Takafumi Taguchi, Nishinomiya, all of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka and Sumitomo Rubber Industries, Ltd., Hyogo, both of, Japan

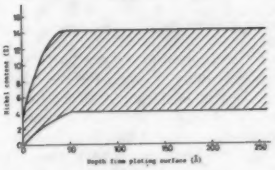
PCT No. PCT/JP88/01081, § 371 Date Apr. 14, 1989, § 102(e) Date Apr. 14, 1989, PCT Pub. No. WO89/03901, PCT Pub. Date May 5, 1989

PCT Filed Oct. 25, 1988, Ser. No. 362,416

Claims priority, application Japan, Oct. 26, 1987, 62-271455; Mar. 3, 1988, 63-50931; Apr. 22, 1988, 63-101012

Int. Cl.[5] B32B *15/06*

U.S. Cl. 428—610 **3 Claims**



1. A metal plated with a copper/zinc/nickel ternary alloy plating comprising 60 to 75 per cent by weight of copper, 4 to 14 per cent by weight of nickel and the remainder of zinc, and the content of nickel being not more than 4 per cent by weight at the outer surface of the plating, increasing gradually with depth from the outer surface to the depth of 50 angstroms, and being about 4 to 14 per cent by weight in the deeper area.

4,929,513

PREFORM WIRE FOR A CARBON FIBER REINFORCED ALUMINUM COMPOSITE MATERIAL AND A METHOD FOR MANUFACTURING THE SAME

Tetsuyuki Kyono; Seiichiro Ohnishi, both of Shiga; Tohru Hanano, Kyoto, and Tohru Hotta, Shiga, all of Japan, assignors to Agency of Industrial Science and Technology, Tokyo, Japan

Filed Jun. 17, 1988, Ser. No. 208,039

Claims priority, application Japan, Jun. 17, 1987, 62-149085

Int. Cl.[5] C22C *1/09*; B32B *15/14*

U.S. Cl. 428—611 **15 Claims**

1. A preform wire for manufacturing a carbon fiber reinforced aluminum composite material comprising:

a continuous fiber bundle of carbon filaments having a ½-width ranging from 25 to 75 cm^{-1}, as measured on the basis of Raman spectroscopy, said ½-width corresponding to ½ of the peak level of a Raman band obtained corresponding to a wave number of about 1,585 cm^{-1}, said peak level attributed to E_{2g} symmetric vibration of a graphite structure;

one or two materials selected from the group consisting of carbon, silicon carbide, titanium, titanium carbide, boron, and titanium boride, said one or two materials covering each of the filaments constituting said continuous fiber bundle; and

a matrix consisting essentially of aluminum or aluminum alloy each of which contains not more than 0.1% of copper and not more than 0.45% of silicon, both based by weight on the weight of the matrix, and infiltrated into said continuous fiber bundle.

4,929,514

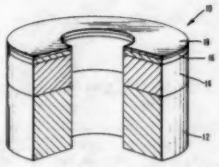
THIN FILM MEDIA FOR HIGH DENSITY LONGITUDINAL MAGNETIC RECORDING

Bangalore R. Natarajan, Cupertino, and Robert G. Walmsley, Palo Alto, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Mar. 22, 1988, Ser. No. 171,587

Int. Cl.[5] H01F *10/00*

U.S. Cl. 428—611 **23 Claims**



21. The disc of claim **19** wherein said magnetic layer consists essentially of about 3 to 10 at% platinum, 14 to 16 at% chromium, and the balance cobalt.

4,929,515

INSULATING ARRANGEMENT FOR OPTICAL INSULATION OF INTEGRATED COMPONENTS AND THE METHOD OF MANUFACTURE

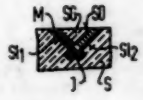
Richard Matz, Feldkirchen/Westerham, and Jutta Zirrgiebel, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jan. 27, 1989, Ser. No. 302,480

Claims priority, application Fed. Rep. of Germany, Feb. 19, 1988, 3805278

Int. Cl.[5] B32B *15/00*

U.S. Cl. 428—614 **6 Claims**



1. An arrangement for optical insulation of an optical component on a substrate for integrated optical devices, said arrangement comprising insulating means for insulating a substrate region from a remaining portion of the substrate, said insulating means being formed by at least two slots formed in the substrate and extending obliquely in from a substrate surface to intersect each other in the interior of the substrate to form a substrate region therebetween having a monolithic connection to the remaining portion of the substrate at least at one end, said substrate region having a size determined by the spacing of the slots at the surface of the substrate and a length defined by the length of the two slots.

4,929,516

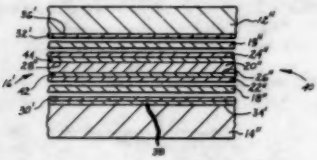
SEMICONDUCTOR DIE ATTACH SYSTEM

Michael J. Pryor, Woodbridge; Julius C. Fister, Hamden; Narendra N. Singhdeo, New Haven; Deepak Mahulikar, Meriden, and Satyam C. Cherukuri, West Haven, all of Conn., assignors to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 740,789, Jun. 8, 1985, abandoned, which is a continuation-in-part of Ser. No. 711,868, Mar. 14, 1985, abandoned. This application Feb. 10, 1986, Ser. No. 826,808

Int. Cl.[5] H32B *15/00*

U.S. Cl. 428—620 **6 Claims**



1. A semiconductor die attach system adapted for attaching a semiconductor die to a substrate, comprising:

a substrate having an oxidation resistant layer on a surface adapted to have the semiconductor die attached thereto, said oxidation resistant layer being of a material selected from the group consisting of gold, silver, palladium, platinum and alloys thereof, said substrate further having a barrier layer between said oxidation resistant layer and said substrate, said barrier layer being of a material selected from the group consisting of nickel, cobalt and alloys thereof;

a semiconductor die having an oxidation resistant layer on a surface;

means disposed between and bonded to said substrate and said semiconductor die for dissipating thermal stress from thermal cycling of said substrate and die, the thermal stress dissipating means comprising:

a thin buffer component having a coefficient of thermal expansion of between about 35×10^{-7} to about 100×10^{-7} in/in/°C.;

bonding means for bonding said buffer component to said substrate and to said surface of said die having said oxidation resistant layer, said bonding means comprising first and second layers of bonding material disposed against opposite bonding surfaces of said buffer component, said bonding material being an alloy of silver-tin having from about 20% by weight to about 40 % by weight silver;

first and second oxidation resistant layers arranged between said first and second layers of bonding material and said opposite bonding surfaces of said buffer component, said first and second oxidation resistant layers being selected from the group consisting of gold, silver, palladium, platinum and alloys thereof; and

first and second barrier layers arranged between said first and second oxidation resistant layers, respectively, and said buffer component, said first and second barrier layers being selected from the group consisting of nickel, cobalt and alloys thereof.

4,929,517

ELECTROCHEMICAL CELL ASSEMBLY

Warren L. Luoma, Manchester, Conn.; Ronald G. Martin, Monson, Mass., and Richard D. Breault, Coventry, Conn., assignors to International Fuel Cells Corp., South Windsor, Conn.

Division of Ser. No. 246,246, Sep. 19, 1988. This application Oct. 31, 1989, Ser. No. 429,893

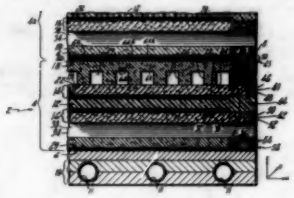
Int. Cl.[5] H01M *2/00*

U.S. Cl. 429—34 **19 Claims**

1. An electrochemical cell assembly which includes a pair of adjacent gas porous plates having electrically and thermally conductive particles joined together leaving a void structure therebetween, the plates being joined together to form an integral structure that is electrically and thermally conductive and which includes a region that blocks the flow of gas and electrolyte, wherein the improvement comprises:

a first porous plate having electrically and thermally conductive particles which are joined together leaving a void structure therebetween, the first plate having a first surface which has a boundary defined by the particles;

a second porous plate having electrically and thermally conductive particles which are joined together leaving a void structure therebetween, the second plate having a second surface which has a boundary defined by the particles, the second surface being spaced from the first surface leaving a region therebetween; and,



binder which is disposed in the region between the plates, the binder extending through the boundary of the first plate into the void structure to form a first layer of particles in binder in the first plate, and extending through the boundary of the second plate into the void structure to form a second layer of particles in binder in the second plate;

wherein electrically and thermally conductive particles are disposed in the region between the plates in the binder to form a third layer of particles in binder, the third layer having a first surface adjacent to the first surface of the first porous plate and a boundary defined by the particles of the third layer which is merged with the boundary of the first porous plate, the third layer having a second surface adjacent to the second surface of the porous plate and a boundary defined by the particles of the third layer which is merged with the boundary of the second porous plate.

4,929,518

SEALED LEAD-ACID STORAGE BATTERY

Minoru Yoshinaka, Osaka; Koujirou Matsuo, Chigasaki; Kiichi Koike, Fujisawa; Yoshie Suzuki, and Mansaku Sugimoto, both of Chigasaki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

PCT No. PCT/JP87/00164, § 371 Date Nov. 19, 1987, § 102(e) Date Nov. 19, 1987, PCT Pub. No. WO87/05749, PCT Pub. Date Sep. 24, 1987

PCT Filed Mar. 16, 1987, Ser. No. 138,458

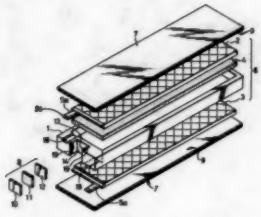
Claims priority, application Japan, Mar. 19, 1986, 61-62125; Mar. 20, 1986, 61-62222

Int. Cl.[5] H01M *2/12, 2/02, 6/04*

U.S. Cl. 429—54 **10 Claims**

1. A sealed lead-acid storage battery comprising a group of electrodes consisting of a positive electrode, a negative electrode, and a separator sandwiched between two metal plates having a polyolefin resin film or sheet laminated on one surface thereof such that said polyolefin resin layers of said metal plates face said group of electrodes, said group of electrodes is hermetically sealed in a casing made of said polyolefin resin, said casing is thermally bonded to a periphery of said group of electrodes and a peripheral rim of said metal plates, said battery further comprising, a protruding portion of a positive electrode and a negative electrode coated with an epoxy resin

and again coated with said polyolefin resin on said epoxy resin layer, said resulting protruding portions are sandwiched between said casing and said metal plates having said polyolefin layer so that said group of electrodes is hermetically sealed and



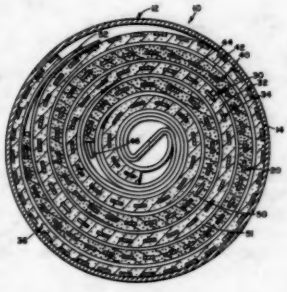
said protruding portions are hermetically sealed between said casing and said resin layer surfaces of said metal plates, with an uncoated edge of said protruding portions in direct contact with a film-removed portion of an adjacent metal plate.

4,929,519

WOUND ELECTRODE ASSEMBLY FOR AN ELECTROCHEMICAL CELL

Arthur J. Catotti, Gainesville, Fla., assignor to Gates Energy Products, Inc., Gainesville, Fla.

Filed Jul. 20, 1989, Ser. No. 383,376
Int. Cl.[5] H01M *6/10*
U.S. Cl. 429—94 **30 Claims**



1. In a sealed electrochemical cell having a wound electrode assembly positioned within a container, said electrode assembly having at least one electrode comprised of an electrically conductive substrate and an electrochemically active material secured to at least one face of the substrate, said one electrode defining an outer wrap for said electrode assembly, the improvement comprising:

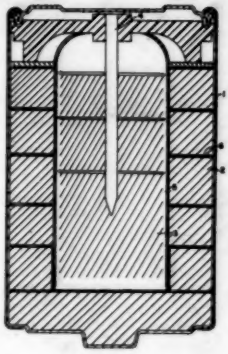
at least a portion of said substrate on one side thereof in said outer wrap being free of electrochemically active material and directly contacting a portion of said container, and said electrochemically active material being secured to at least a portion of the substrate in said outer wrap on the other side thereof directly opposite said one side making contact with the container.

4,929,520

RECHARGEABLE ALKALINE MANGANESE DIOXIDE-ZINC CELL WITH LOW INTERNAL RESISTANCE AND IMPROVED CYCLE LIFE

Karl Kordesch, and Wilhelm Harer, both of Graz, Austria, assignors to Battery Technologies Inc., Canada

Filed Apr. 10, 1989, Ser. No. 335,290
Claims priority, application Canada, Apr. 11, 1988, 563843
Int. Cl.[5] H01M *2/18, 6/10*
U.S. Cl. 429—94 **8 Claims**



1. Rechargeable alkaline manganese dioxide—zinc cell of the type comprising a metal container including a porous cathode consisting of a plurality of adjoining blocks, a zinc anode and a separator separating the cathode and anode, and an electrolyte impregnating said cathode and contacting with said separator and anode, characterized in that an electrically conducting cloth member is arranged between said blocks, said member comprising fibres wetted by said electrolyte to increase conductivity between said electrolyte and said blocks.

4,929,521

SOLID ELECTROLYTE BATTERY

Robert A. Cipriano, Lake Jackson; R. Vernon Snelgrove, Damon, and Francis P. McCullough, Jr., Lake Jackson, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 250,789, Sep. 28, 1988, Pat. No. 4,886,715, which is a continuation-in-part of Ser. No. 4,003, Jan. 16, 1987, abandoned, which is a continuation-in-part of Ser. No. 3,974, Jan. 16, 1987, abandoned. This application Nov. 1, 1988, Ser. No. 265,653
The portion of the term of this patent subsequent to Dec. 12, 2006, has been disclaimed.
Int. Cl.[5] H01M *6/18*
U.S. Cl. 429—102 **10 Claims**

1. In a primary rechargeable electrical energy storage device comprising at least one cell having an anode, a cathode and a solid electrolyte, the improvement which comprises said elec-

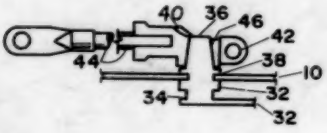
trolyte comprising a lithium salt of an aliphatic acid having 10 to 24 carbon atoms.

4,929,522

HIGH CURRENT CAPACITY ELECTRICAL CORROSIVE ELECTROLYTE BATTERY ELECTRICAL INTERCONNECTION SYSTEM

Edwin J. Ward, P.O. Box 482, Hatch, N. Mex. 87937, and Thomas C. Ward, II, P.O. Box 215, Carrizozo, N. Mex. 88301

Filed Dec. 19, 1988, Ser. No. 286,504
Int. Cl.[5] H01M 2/32
U.S. Cl. 429—178 3 Claims



1. A battery electrical connection system for use with corrosive electrolyte batteries comprising;

a. a plurality of battery terminals, each being integrally attached to a plate strap within a battery;

b. a plurality of conductor cables, each securely cast and engaged into one of said battery terminals to form an electrical connection;

c. conductor cable insulation;

d. a plurality of battery seals integral with and extending the exterior of said battery over said electrical connections, wherein said seals electrically and chemically isolate each of said electrical connections;

e. a conductor cable terminal lug connector; and

f. an insulated ungrounded connector;

wherein one of said conductor cables is securely engaged into one of said battery terminals to provide an electrical connection within a battery; and wherein said cable insulation covers each of said conductor cables above said electrical connection between said conductor cables and said battery terminals; and wherein said battery case seals are integral with and extend the exterior of said battery over said battery terminals, said conductor cables, and said cable insulation; and wherein said conductor cable terminal lug connector extends from one of said conductor cables and connects to a common ground for a battery load; and wherein said insulated ungrounded connector extends from the other of said conductor cables and connects to an ungrounded battery load terminal for completion of an electrical circuit.

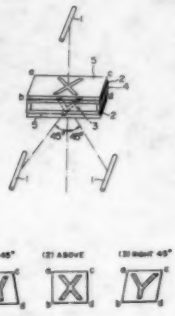
4,929,523

LIGHT CONTROL SHEETS

Shinichiro Kitayama, Minoo; Teruho Adachi, Hirakata; Masahiro Ueda, Minoo; Yuichi Aoki, Tsukuba; Satoshi Shiiki, Yokohama; Akio Takigawa, Nishinomiya; Motoaki Yoshida, Kawanishi; Naoya Imamura, Fujinomiya; Koichi Maeda, Nishinomiya, and Hisayuki Kayanoki, Takarazuka, all of Japan, assignors to Sumitomo Chemical Company Limited and Nippon Sheet Glass Co., Ltd., both of Osaka, Japan

Filed Dec. 16, 1987, Ser. No. 133,603
Claims priority, application Japan, Dec. 18, 1986, 61-302500; Jun. 11, 1987, 62-146564; Jun. 11, 1987, 62-146565; Aug. 7, 1987, 62-197833; Aug. 7, 1987, 62-197834; Aug. 7, 1987, 62-197836; Aug. 7, 1987, 62-197837
Int. Cl.[5] G03F 1/02
U.S. Cl. 430—4 10 Claims

1. A light control sheet capable of scattering a plurality of incident lights each of particular incident angle, said sheet being produced according to a process comprising a first step of preparing a film of a composition composed of at least two photopolymerizable components having different refractive indexes and irradiating on said film a light from a particular direction to obtain a first cured film, a second step of preparing on the first cured film a film of a composition composed of at least two photopolymerizable compositions having different



refractive indexes and irradiating on said film a light from a particular direction different from that in the first step to obtain a second cured film on the first cured film, and a step of repeating the second step, if desired.

4,929,524

ORGANIC PHOTO CONDUCTIVE MEDIUM

Kunihiro Sakai, Yamato; Toshihiko Miyazaki, Atsugi; Ken Eguchi, Atsugi; Haruki Kawada, Atsugi; Yoshinori Tomida, Atsugi; Toshiaki Kimura, Sagamihara; Hiroshi Matsuda, Yokohama; Kiyoshi Takimoto, Atsugi, and Kenji Saito, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 10, 1987, Ser. No. 99,345
Claims priority, application Japan, Sep. 12, 1986, 61-213973; Sep. 12, 1986, 61-213974; Sep. 12, 1986, 61-213975; Sep. 12, 1986, 61-213976; Sep. 12, 1986, 61-213977
Int. Cl.[5] G03G 5/06
U.S. Cl. 430—56 58 Claims

1. An organic photoconductive medium, comprising a substrate having an uneven pattern and an organic photoconductive layer which exhibits an insulating property in the direction of a layer thickness and a photoconductive property in the direction of a layer plane and which is provided on the substrate, an anisotropic property being imparted to the photoconductive property of the photoconductive layer in the direction of a layer plane, wherein the photoconductive organic layer is the monomolecular film of a photoconductive organic compound having a hydrophobic site and a hydrophilic site in one molecule or a built-up film thereof.

4,929,525

PHOTOCONDUCTOR FOR ELECTROPHOTOGRAPHY CONTAINING AZO OR DISAZO

Masami Kuroda; Yoshimasa Hattori, and Noboru Furusho, all of Kawasaki, Japan, assignors to Fuji Electric Co., Ltd.

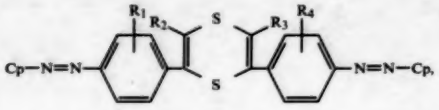
Filed Dec. 6, 1988, Ser. No. 283,060
Claims priority, application Japan, Dec. 8, 1987, 62-310508; Dec. 8, 1987, 62-310509; Dec. 23, 1987, 62-325962; Jan. 13, 1988, 63-5138; Jan. 18, 1988, 63-7681
Int. Cl.[5] G03G 5/06
U.S. Cl. 430—75 18 Claims

1. A photoconductor for electrophotography, comprising:

an electroconductive substrate; and

a photosensitive layer formed on said electroconductive substrate and including at least one azo compound repre-

sented by the following general formula (I) as a charge generating substance:



(I)

wherein each of R_1, R_2, R_3 and R_4 stands for a hydrogen atom, a halogen atom, a hydroxy group, an alkyl group, an alkoxy group, an allyl group, an aryl group, an aralkyl group, a carboxyl group, or an ester group, and

wherein C_p stands for a residual group of a coupler.

4,929,526

ELECTROPHOTOGRAPHIC LITHOGRAPHIC PRINTING PLATE PRECURSOR

Eiichi Kato; Kazuo Ishii; Ryosuke Itakura, and Hidefumi Sera, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 17,408, Feb. 24, 1987, abandoned. This application Mar. 7, 1989, Ser. No. 319,895

Claims priority, application Japan, Feb. 24, 1986, 61-37321; Mar. 12, 1986, 61-52364

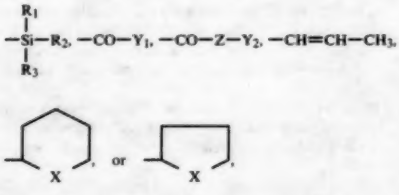
Int. Cl.[5] G03G *5/087*

U.S. Cl. 430—87 **54 Claims**

1. An electrophotographic lithographic element produced by a process comprising an electrophotographically imaging a lithographic printing plate precursor comprising a conductive support having provided thereon at least one photoconductive layer containing photoconductive zinc oxide and a resin binder followed by subjecting said photoconductive layer to an oil-desensitization treatment, wherein said resin binder comprises a resin containing at least one functional group per molecule thereof capable of forming at least one hydroxyl group upon being decomposed by said oil-desensitization treatment, wherein said resin contains at least one functional group per molecule thereof represented by formula (I):

$$-O-L \qquad (I)$$

wherein L represents



wherein R_1, R_2, and R_3 each represents a hydrogen atom, a hydrocarbon group, or —O—R′, wherein R′ represents a hydrocarbon group; X represents a sulfur atom or an oxygen atom; Y_1 represents a substituted straight chain or branched chain alkyl group having 1 to 6 carbon atoms; Y_2 represents a hydrocarbon group; and Z represents an oxygen atom, a sulfur atom or -NH- or wherein said resin contains at least one functional group in which at least two hydroxyl groups spaced sterically close together are protected with one protective group.

4,929,527

METHOD OF IMAGE FORMATION WHICH INCLUDES SCANNING EXPOSURE PROCESS

Eiichi Kato; Shigeru Ohno; Kazuo Ishii, and Ryosuke Itakura, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 22, 1988, Ser. No. 185,181

Claims priority, application Japan, Apr. 22, 1987, 62-97523

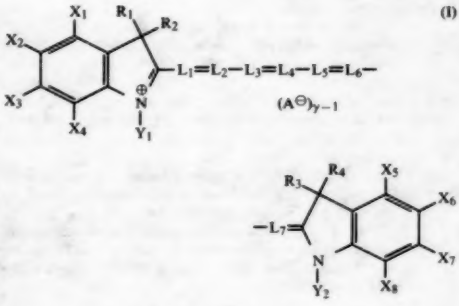
Int. Cl.[5] G03G *5/09, 13/22*

U.S. Cl. 430—92 **9 Claims**

1. A method of electrographic image formation which comprises exposing a photosensitive body comprising a photoconductive composition to a scanning laser beam and developing the exposed photosensitive body,

wherein said photoconductive composition comprises at least an inorganic photoconductor, a spectral sensitizing dye and a cyclic acid anhydride dispersed in a binding resin, said cyclic acid anhydride being present in an amount of from 0.0001 to 1.0 part by weight per 100 parts by weight of said photoconductor,

wherein said dye is a compound containing at least one carboxyl group, sulfo group and/or phospho group and is represented by formula (I),

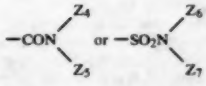


(I)

wherein R_1, R_2, R_3 and R_4 may be the same or different and each represents an alkyl group,

wherein L_1 to L_7 may be the same or different each is a substituted or unsubstituted methine group,

wherein X_1 to X_8 may be the same or different and each is a hydrogen atom; a carboxyl group; a sulfo group; a halogen atom; a nitro group; a cyano group; a substituted or unsubstituted alkyl group; a substituted or unsubstituted aralkyl group; a substituted or unsubstituted aryl group; an OZ_1, —$OCOZ_2$ or —$COOZ_3$ group wherein Z_1, Z_2 and Z_3 may be the same or different and each represents a substituted or unsubstituted aliphatic group, a substituted or unsubstituted aromatic group or a substituted or unsubstituted heterocyclic group; a



group wherein Z_4, Z_5, Z_6 and Z_7 may be the same or different and each represents a hydrogen atom, a substituted or unsubstituted aliphatic group, a substituted or unsubstituted aromatic group, or Z_4, Z_5 or Z_6 and Z_7 together, with the adjacent atom, N, form a heterocyclic group,

with the further proviso that X_5 and X_6 may be connected to each other to form a benzene ring,

with the even further proviso that at least one of X_1 to X_8 represents a group other than a hydrogen atom;

wherein Y_1 and Y_2 may be the same or different and each is a substituted or unsubstituted alkyl group;

A $\ominus$ represents an anion;

γ represents 1 or 2, further providing that when Y_1 and/or Y_2 contains a sulfo or phospho group, γ is 1.

4,929,528

COATED CARRIER FOR DEVELOPER

Masayoshi Shinoki; Masahiro Takagi; Ikutaroh Nagatsuka; Koichi Kumashiro; Takayoshi Aoki, and Masayuki Takeda, all of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Nov. 7, 1988, Ser. No. 267,882

Claims priority, application Japan, Nov. 5, 1987, 62-278362; Nov. 5, 1987, 62-278363

Int. Cl.[5] G03G *9/14*

U.S. Cl. 430—108 **13 Claims**

1. A carrier for a developer comprising a core material coated with a coating material consisting essentially of a copolymer of vinylidene fluoride and trifluorethylene.

4,929,529

METHOD OF INCREASING SENSITIVITY OF DIGITAL PHOTOSENSITIVE MEMBER

Koichi Kinoshita, 34-13, Nishi-Kusabuka-Cho, Shizuoka-Shi, Shizuoka-Ken, Japan

Filed Oct. 20, 1988, Ser. No. 260,601

Claims priority, application Japan, Dec. 26, 1987, 62-331308

Int. Cl.[5] G03G *5/02*

U.S. Cl. 430—127 **21 Claims**

1. A method for increasing the sensitivity to a light signal of a digital photosensitive member which undergoes an avalanche effect when illuminated with light above a threshold intensity level, comprising

uniformly illuminating said photosensitive member with light at an intensity level below said threshold level required to trigger said avalanche effect, and

illuminating said photosensitive member with said light signal during said uniform illumination, the total intensity of said uniform illumination and said light signal being greater than said threshold level.

4,929,530

LIGHT IMAGE FORMING MATERIAL AND IMAGE-RECORDING METHOD USING SUCH

Keiso Saeki, and Tosiaki Endo, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 16, 1989, Ser. No. 324,504

Claims priority, application Japan, Mar. 16, 1988, 63-62146; Apr. 1, 1988, 63-80281

Int. Cl.[5] G03C *1/72*

U.S. Cl. 430—138 **18 Claims**

1. A light image forming material comprising:

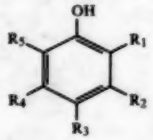
a support;

(A) at least one member selected from the group consisting of oxidative-developable leuco dyes;

(B) at least one member selected from the group consisting of photo-oxidizing agents;

(C) at least one reducing agent; and

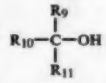
(D) at least one organic sulfonamide compound and/or at least one member selected from the group consisting of hydroxy compounds represented by the following Formula (I) or (II),



(I)

wherein R_1, R_2, R_3, R_4 and R_5, which may be the same or different, each represents a hydrogen atom, an alkyl group, a cycloalkyl group, an aryl group, an alkoxy group, a group of the formula $COOR_6$ or a group of the formula

wherein each of said alkyl group, said aryl group and said alkoxy group may be substituted with at least one of a halogen atom, a hydroxyl group, an alkoxy group, an aryl group and an aryloxy group; R_6 represents an alkyl group and R_7 and R_8, which may be the same or different, each represents a hydrogen atom or an alkyl group,



(II)

wherein R_9, R_{10} and R_{11}, which may be the same or different, each represents a hydrogen atom, an alkyl group, an aryl group, a hydroxyalkyl group or an aryloxyalkyl group and each group may be substituted with at least one of a halogen atom, a hydroxyl group, an alkoxy group, an aryl group, an aryloxy group, a hydroxyalkyl group and a hydroxyalkoxy group, said leuco dye (A) and said photo-oxidizing agent (B) being present in microcapsules, and said reducing agent (C) and said organic sulfonamide compound and/or said hydroxy compound (D) being present outside said microcapsule.

4,929,531

PROCESS FOR PRODUCING PHOTOSENSITIVE COMPOSITION CAPABLE OF FORMING FULL COLOR IMAGES FROM A SINGLE CAPSULE BATCH

Chuan Lee, and Kerry Kovacs, both of Centerville, Ohio, assignors to The Mead Corporation, Dayton, Ohio

Filed Jul. 13, 1988, Ser. No. 218,717

Int. Cl.[5] G03C *1/68, 1/72*

U.S. Cl. 430—138 **16 Claims**

1. A photosensitive material capable of forming full color images having controlled continuous tone comprising:

a substrate having front and back surfaces;

a first set of color-forming microcapsules having a first internal phase comprising a first color-forming agent and a first photohardenable or photosoftenable composition;

a second set of color-forming microcapsules having a second internal phase comprising a second color-forming agent and a second photohardenable or photosoftenable composition;

a third set of color-forming microcapsules having a third internal phase comprising a third color-forming agent and a third photohardenable or photosoftenable composition; and

a coating located on either of said front or back surfaces, said coating comprising said first, second and third sets of microcapsules;

wherein said coating is produced by a continuous phase, single batch process comprising the steps of:

providing an agitating aqueous phase;

dispersing a first internal phase comprising a first color-forming agent and a first photohardenable or photosoftenable composition in said continuous phase to form droplets of said first internal phase in said continuous phase;

dispersing a second internal phase comprising a second color-forming agent and a second photohardenable or

photosoftenable composition in said continuous phase to form droplets of said second internal phase in said continuous phase;

dispersing a third internal phase comprising a third color-forming agent and a third photohardenable or photosoftenable composition in said continuous phase to form droplets of said third internal phase in said continuous phase, wherein each of said first, second and third internal phases are independently dispersed in said continuous phase in the presence of a pre-wall-forming agent which controls droplet intermixing; and

forming discrete microcapsule walls around said droplets of said first, second and third internal phases, wherein each of said first, second and third color-forming agents is different and in combination are capable of producing full color images upon reaction with a developer material.

4,929,532

DIAZO NEGATIVE COLOR PROOFING PROCESS UTILIZING ACRYLIC/ACRYLATE POLYMERS

Thomas A. Dunder, Chapel Hill, N.C., assignor to Hoechst Celanese Corporation, Somerville, N.J.

Continuation of Ser. No. 6/909,138, Sep. 19, 1986, abandoned, Continuation-in-part of Ser. No. 6/880,770, Jul. 1, 1986, abandoned. This application Apr. 12, 1989, Ser. No. 338,356

Int. Cl.[5] G03C *5/18, 7/00*

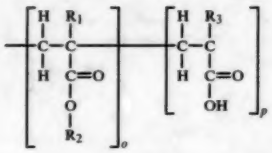
U.S. Cl. 430—143 **20 Claims**

1. A method for forming a colored image which comprises

(A) providing a photosensitive element which comprises, in order:

(i) a substrate having a release surface; and

(ii) a single photosensitive layer on said release surface, which photosensitive layer comprises in admixture a light sensitive, negative working, polymeric diazonium compound in an amount sufficient to photosensitize the layer; a resinous binder composition in an amount sufficient to bind the layer components, which composition consists essentially of a major amount of an acid containing acrylic copolymer having the formula



wherein:

R_1 is H or, CH_3

R_2 is CH_3, CH_2CH_3, $(CH_2)_3CH_3$, n-octyl, or 2-ethyl hexyl

R_3 is H, CH_3, or COOH

o is equal to 4 to 12, and

p is equal to 1, and

said copolymer having an average molecular weight in the range of from about 10,000 to about 300,000, and at least one colorant in an amount sufficient to color the layer; and

(iii) an adhesive layer directly adhered to said color photosensitive layer, which adhesive layer comprises a polyvinyl acetate polymer and which adhesive layer has a softening point in the range of from about 60° C. to about 180° C.; and thereafter

(B) either

(i) laminating said element with heat and pressure via said adhesive layer to a developer resistant receiver sheet; and removing said substrate by the application of peeling forces; and imagewise exposing said photosensitive layer to actinic radiation; or

(ii) imagewise exposing said photosensitive layer to actinic radiation; and laminating said element with heat and pressure via said adhesive layer to a developer resistant receiver sheet; and removing said substrate by the application of peeling forces; or

(iii) laminating said element with heat and pressure via said adhesive layer to a developer resistant receiver sheet; and imagewise exposing said photosensitive layer to actinic radiation; and removing said substrate by the application of peeling forces; and

(C) removing the non-exposed areas of said photosensitive layer with a liquid developer, which removing is conducted at a temperature at which said adhesive layer is substantially non-tacky.

4,929,533

PROCESS FOR PRODUCING PRESENSITIZED DIAZO RESIN LITHOGRAPHIC PRINTING PLATE USING 1-METHOXY-2-PROPANOL AS COATING SOLVENT

Nobuo Nishikawa, and Hiroshi Misu, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 896,025, Aug. 13, 1986, abandoned. This application Jul. 1, 1988, Ser. No. 214,805

Claims priority, application Japan, Aug. 14, 1985, 60-178716

Int. Cl.[5] G03C *1/74, 1/60*

U.S. Cl. 430—169 **13 Claims**

1. A process for producing a presensitized lithographic printing plate by coating onto a surface-roughened aluminum plate a solution having dissolved in a solvent containing at least 10 wt % of 1-methoxy-2-propanol a negative working, light-sensitive composition consisting of a light-sensitive diazo resin in an amount sufficient to harden the composition by light illumination, a high-molecular weight copolymer which will dissolve or swell in an aqueous alkali developer in an amount from 97 to 60 wt % of the total weight of the diazo resin and the high-molecular weight copolymer which will dissolve or swell in an aqueous alkali developer and from 0 to 30 wt % based on the total weight of the composition of an additive selected from the group consisting of coatability improving agents, plasticizers which impart flexibility or wear resistance to the light-sensitive composition, colorants, and stabilizers for the diazo resin, and which composition becomes insolubilized or less-swellable in the aqueous alkali developer upon light illumination and development with the aqueous alkali developer, and drying the coated solution wherein the 1-methoxy-2-propanol is present in sufficient amount during coating to provide resistance to soiling in non-image areas during printing of the lithographic printing plate.

4,929,534

POSITIVE-WORKING PHOTOSENSITIVE MIXTURE AND PHOTOLITHOGRAPHIC COPYING MATERIAL PRODUCED THEREFROM WITH O-QUINONE DIALIDE SULFONYL ESTER AND AZO COUPLER

Trutz-Ulrich Stephani, Erding; Dieter Mohr, Budenheim; Britta Maisel, Bischofsheim, and Werner Frass, Wiesbaden, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am/Main, Fed. Rep. of Germany

Filed Aug. 26, 1988, Ser. No. 236,916

Claims priority, application Fed. Rep. of Germany, Aug. 31, 1987, 3729035

Int. Cl.[5] G03C *1/60, 1/58, 1/54*

U.S. Cl. 430—191 **7 Claims**

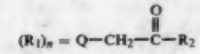
1. A positive-working photosensitive, mixture consisting essentially of:

about 10% to 30% by weight, based on the nonvolatile constituents of a photosensitive sulfonic acid ester of o-quinine diazide with an aromatic hydroxyl compound having a molecular weight of about 800 to 8,000 daltons,

a polymeric water-insoluble binder which is soluble or at least swellable in aqueous-alkaline solutions in an amount sufficient to produce a uniform film, and

a coupler compound which can form an azo coupling with

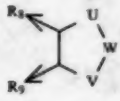
the o-quinine diazide, wherein the coupler is a compound of the formula I



I

where
n = 1, Q = carbonyl, and
n = 0, Q = cyano,

R_1, R_2 are identical or different and denote alkyl, cycloalkyl, alkoxy, alkyl-, aryl- or acylamino, alkoxycarbonylamido, heteroaryl or a heteroarylimino of the formula III



III

wherein
U,V,W are identical or different, and denote in each case one of the following groups: methylene, which may be unsubstituted or substituted by alkyl, aryl, phenyl, carboxyl, or carboxylamide; carbonyl, carbonylimino, sulfur, selenium, oxygen, amino, imino, which may be unsubstituted or substituted by alkyl or aryl; and
R_8 and R_9 are identical or different and denote hydrogen or alkyl
wherein the equivalent ratio of coupler to o-quinine diazide compound is about 0.5 to 3.

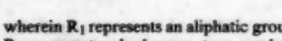
4,929,535

HIGH CONTRAST NEGATIVE IMAGE-FORMING PROCESS

Toshiro Takahashi; Kimitaka Kameoka, and Yoshio Inagaki, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 907,770, Sep. 12, 1986, abandoned. This application Jun. 30, 1988, Ser. No. 214,892
Claims priority, application Japan, Jan. 22, 1985, 60-9347
Int. Cl.[5] G03C *1/06, 5/24*
U.S. Cl. 430—264 **6 Claims**

1. A high contrast negative image-forming process which comprises image-wise exposing and subsequently developing a silver halide photographic material having on a support at least one silver halide emulsion layer, said silver halide emulsion layer or at least one other hydrophilic colloid layer containing a high contrast imparting hydrazine derivative represented by general formula (I)



(I)

wherein R_1 represents an aliphatic group or an aromatic group; R_2 represents a hydrogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted aryl group, a substituted or unsubstituted alkoxy group, or a substituted or unsubstituted aryloxy group; and G represents a carbonyl group, a sulfonyl group, a sulfoxy group, a phosphoryl group, or an N-substituted or unsubstituted iminomethylene group, and said development occurring in the presence of a compound represented by the following general formula (A):

(A)

wherein R_1, R_2 and R_3 each represent an alkyl group, a cycloalkyl group, an aryl group, an alkenyl group, a cycloalkenyl group, or a heterocyclic ring residue; these groups each may have a substituent; m represents an interger; L represents an m-valent organic group bonded to the P atom through a carbon atom; n represents an integer of 1 to 3; X represents an n-valent anion; said X may be bonded to L; and wherein development time is from 15 to 60 seconds.

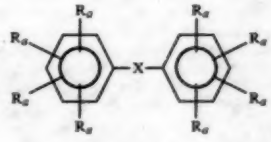
4,929,536

IMAGE REVERSAL NEGATIVE WORKING O-NAPTHOQUINONE DIAZIDE AND CROSS-LINKING COMPOUND CONTAINING PHOTORESIST PROCESS WITH THERMAL CURING

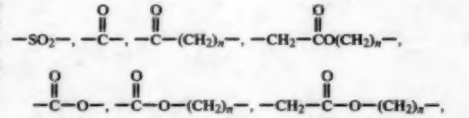
Mark A. Spak, Edison; Donald Mammato, Lebanon; Dana Durham, Bloomsbury, and Sangya Jain, Bridgewater, all of N.J., assignors to Hoechst Celanese Corporation, Somerville, N.J.

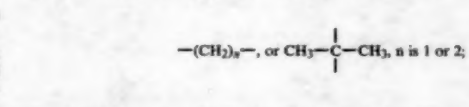
Continuation of Ser. No. 895,609, Aug. 11, 1986, abandoned, which is a continuation-in-part of Ser. No. 889,032, Jul. 23, 1986, abandoned, which is a continuation-in-part of Ser. No. 764,700, Aug. 12, 1985, abandoned. This application Nov. 8, 1988, Ser. No. 268,639
Int. Cl.[5] G03F *7/26*
U.S. Cl. 430—325 **16 Claims**

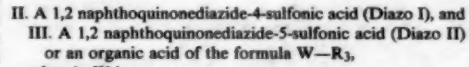
1. A process for preparing and using a negative working photographic element which consists essentially of, in order:
(a) forming a composition which consists essentially of in admixture:
(i) from about 1% to about 25% based on the weight of a the solid parts of the composition of a photosensitive composition comprising the condensation product of:
I. A phenolic compound having the structure:



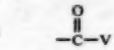
wherein: R_a is H, OH, halogen or lower alkyl, with at least two and not greater than six R_a radicals being OH, and X is a single C—C bond, —O—, —S—,







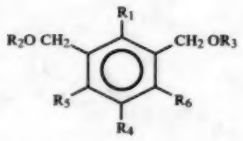
II. A 1,2 naphthoquinonediazide-4-sulfonic acid (Diazo I), and
III. A 1,2 naphthoquinonediazide-5-sulfonic acid (Diazo II)
or an organic acid of the formula W—R_3,
wherein W is



or —SO_2—V, V is halogen and R_3 is alkyl, aryl, substituted alkyl or substituted aryl;
wherein the molar ratio of the amount of Diazo I reacted to the amount of Diazo II and/or organic acid reacted is the range of from about 1:1 to about 39:1;
(ii) from about 75% to about 99% based on the weight of

the solid parts of the composition of a novolak resin; and

(iii) from about 0.5% to about 20% based on the weight of the solids parts of the composition of a crosslinking compound which, when in the presence of that amount and strength of the acid generated when said diazide is exposed to actinic radiation, is capable of crosslinking said resin under the application of the heating conditions of step (e), said crosslinking compound has the formula



wherein R_1, R_4, R_5, R_6 are independently H, (C_1–C_6)alkyl, (C_3–C_6)cycloalkyl, aryl, arylalkyl or OR_2; and R_2, R_3 are independently H, (C_1–C_6)alkyl, (C_3–C_6)cycloalkyl, aryl or arylalkyl; and

(iv) sufficient solvent to dissolve the foregoing composition components; and

(b) coating said composition on a substrate; and

(c) heating said coated substrate at a temperature of from about 20° to about 100° C. until substantially all of said solvent is dried off; and

(d) imagewise exposing said composition to actinic, electron beam, ion beam or x-ray radiation; and

(e) heating said coated substrate at a temperature of at least about 95° C. to about 160° C. for about 10 seconds or more to crosslink said resin; and

(f) removing the unexposed non-image areas of said composition with a developer wherein the process is conducted in the absence of a flood exposure after heating step (e).

4,929,537

PHOTORESIST COMPOSITIONS BASED ON HYDROXYSTYRENE COPOLYMERS

Balaram Gupta, North Plainfield, and Palaiyur S. Kalyanaraman, Fanwood, both of N.J., assignors to Hoechst Celanese Corp., Somerville, N.J.

Division of Ser. No. 148,261, Jan. 25, 1988, Pat. No. 4,869,994. This application Jul. 27, 1989, Ser. No. 385,747

Int. Cl.[5] G03C *5/16, 1/68*

U.S. Cl. 430—325 **13 Claims**

1. A process for forming an image on a surface comprising depositing a negative acting photoresist composition on said surface as a film, wherein said composition consists essentially of a solution of (A) a copolymer of 4-hydroxystyrene and a monomer selected from the group consisting of dialkyl muconate, alkyl sorbate, alkadiene monomers and allyl esters of ethylenically unsaturated acids wherein the alkyl groups contain 1 to 4 carbon atoms and (B) an aromatic bisazide compound, heating the film to remove solvent, exposing a portion of the film to ultraviolet radiation which decreases the solubility of the copolymer, and removing the unexposed portion of said film with solvent.

4,929,538

SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL

Masakazu Morigaki, and Kozo Aoki, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

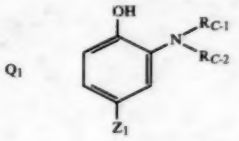
Filed Sep. 29, 1987, Ser. No. 102,511

Claims priority, application Japan, Sep. 29, 1986, 61-230854

Int. Cl.[5] G03C *1/34, 7/34*

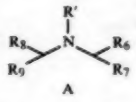
U.S. Cl. 430—551 **21 Claims**

1. A silver halide color photographic material comprising a support having thereon a silver halide emulsion layer containing at least one coupler represented by formula (C-I) and at least one compound represented by formula (A-II) which are co-emulsified with each other



(C-I)

wherein Q_1 represents an atomic group containing at least one nitrogen atom required to form a 5- or more membered nitrogen-containing heterocyclic ring together with the carbon atoms to which it is bonded, said atomic group being represented by the formula $—NR_{C\text{-}3}CO—Q_1—$, wherein Q_1 is selected from the group consisting of a divalent amino group, an ether group, a thioether group, an alkylene group, a vinylene group, an imino group, a sulfonyl group, a carbonyl group, an arylene group, a divalent heterocyclic group, and combinations thereof, and $R_{C\text{-}3}$ represents a hydrogen atom or an alkyl group; Z_1 represents a hydrogen atom or a coupling-off group; $R_{C\text{-}1}$ represents an acyl group or a sulfonyl group; and $R_{C\text{-}2}$ represents a hydrogen atom or a $C_{1\text{-}8}$ aliphatic group; or the substituents for $R_{C\text{-}1}$, $R_{C\text{-}2}$, Z_1, or Q_1 form a dimeric or polymeric coupler



(A-II)

wherein R′ represents a hydrogen atom, an aliphatic group, an acyl group, a sulfonyl group, a sulfinyl group, an oxyradical group, or a hydroxyl group; A represents a non-metallic atomic group forming a 5-, 6-, or 7-membered ring; and R_6, R_7, R_8, and R_9 each represents a hydrogen atom or an alkyl group, or the substituents represented by R_6 and R_7, R_8 and R_9, or R′ and R_6 are bonded to each other to form a 5-, 6-, or 7-membered ring.

4,929,539

SILVER HALIDE PHOTOSENSITIVE MATERIALS FOR COLOR PHOTOGRAPHY

Ryosuke Sato; Katsunori Kato; Takashi Sasaki, and Hiroshi Sugita, all of Tokyo, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Division of Ser. No. 540,720, Oct. 11, 1983, Pat. No. 4,772,542, which is a division of Ser. No. 522,818, Aug. 12, 1983, Pat. No. 4,451,559, which is a continuation of Ser. No. 385,096, Jun. 4, 1982, abandoned. This application May 6, 1988, Ser. No. 191,224

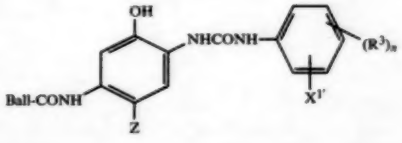
Claims priority, application Japan, Jun. 11, 1981, 56-90334; Jun. 11, 1981, 56-90335; Jun. 11, 1981, 56-90336

The portion of the term of this patent subsequent to May 29, 2001, has been disclaimed.

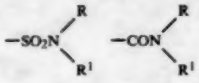
Int. Cl.[5] G03C *7/34*

U.S. Cl. 430—553 **5 Claims**

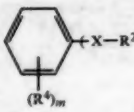
1. A silver halide color photosensitive material for color photography which comprises a phenol type cyan coupler having the formula:



wherein
R^3 is a hydrogen atom, a halogen atom, a hydroxy group, a nitro group, or a monovalent organic group;
$X^{1'}$ is $-COOR^1$, $-COR^1$, $-SO_2OR^1$,



$-NO_2$ or $-CF_3$, in which R is a hydrogen atom, an alkyl group or an aryl group and R^1 is an alkyl group or an aryl group;
Z is a hydrogen atom or a removable group upon a coupling reaction with an oxidized product of a color developing agent:
n is 0 to 3; and
Ball has the formula:



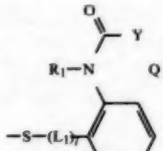
wherein
X is an oxygen atom or a sulfur atom;
R^4 is a group selected from the group consisting of a hydrogen atom, a halogen atom, an alkyl group, an aryl group, a heterocyclic group, an aralkyl group, an alkoxy group, an aryloxy group, a hydroxy group, an acyloxy group, a carboxy group, an alkoxycarbonyl group, an aryloxycarbonyl group, a mercapto group, an alkylthio group, an arylthio group, an alkylsulfonyl group, an arylsulfonyl group, an acyl group, an acylamino group, a sulfonamido group, a carbamoyl group and a sulfamoyl group;
R^2 is a straight or branched alkylene group;
m is 1 to 4; and
l is 0 or 1.

4,929,540
SILVER HALIDE COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

Nobuo Furutachi, and Takeshi Hirose, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

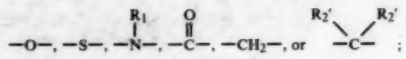
Filed Jul. 17, 1989, Ser. No. 380,489
Claims priority, application Japan, Jul. 18, 1988, 63-178486
Int. Cl.[5] G03C *1/08*
U.S. Cl. 430—555 **7 Claims**

1. A silver halide color photographic light-sensitive material comprising a support and at least one silver halide photographic emulsion layer on the support, said emulsion layer containing a 5-pyrazolone coupler having a coupling eliminable group of the following general formula (I) at the coupling site thereof:

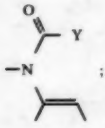


(I)

wherein L_1 represents a substituted or an unsubstituted methylene or ethylene group; l represents 0 or 1; m represents 0 or an integer from 1 to 3; R_1 represents a hydrogen atom, or a substituted or an unsubstituted alkyl, aryl or heterocyclic group; Y represents



Q represents a single bond or nonmetal atoms necessary to complete a 5- to 8-membered ring together with

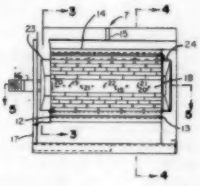


said 5- to 8-membered ring may further has a saturated or an unsaturated ring condensed thereto; R_2 represents a halogen atom, an alkyl group; an aryl group, an alkoxy group, an aryloxy group, an alkylthio group, an arylthio group, an alkylsulfonyl group, an arylsulfonyl group, an acylamino group, an alkoxycarbonylamino group, a sulfonamido group, a sulfamoyl group, an ureido group, an alkoxycarbonyl group, an aryloxycarbonyl group, an acyl group, a cyano group, a trifluoromethyl group, an amino group, an N-alkylamino group, an N-arylamino group, an N,N-dialkylamino group, a diacylamino group, an imido group or a carbamoyl group, and when m represents 2 or 3, R_2 groups may be the same or different; R_2' represents a hydrogen atom, or has the same meaning as R_2 and two R_2' groups may be linked to form a 5- to 7-membered saturated or unsaturated ring; and —Y Z may be a substituted or an unsubstituted carbon-carbon or carbon-nitrogen double bond.

4,929,541
DIRECT GAS FIRED INDUSTRIAL AIR HEATER BURNER

Gary J. Potter, Marthasville; David S. Schlote, House Springs, and Robert W. Reinkemeyer, Wentzville, all of Mo., assignors to Cambridge Engineering, Inc., Chesterfield, Mo.

Filed Sep. 2, 1988, Ser. No. 240,150
Int. Cl.[5] F24H *1/00*
U.S. Cl. 432—222 **25 Claims**



1. In a burner assembly for location within an air supply housing and ductwork for a heater and disposed for inducing the movement of air through a blower and into and around a burner assembly during heater operation to create a supply of heated air for a space to be warmed, said burner assembly being of the type having opposite side walls and upper and lower tiered baffles forming a combustion chamber for reception and combustion of gas delivered from a gas manifold arranged approximately at the intake end of the burner assembly, the improvement which comprises said gas manifold having a series of gas discharge ports provided along its length, and said discharge ports being of varying sizes.

4,929,542

IN VITRO SCREENING TEST FOR MUTAGENICITY AND GENOTOXICITY DURING SPERMATOGENESIS

Michael S. Risley, City Island, N.Y., assignor to Cornell Research Foundation, Inc., Ithaca, N.Y.

Filed Oct. 30, 1987, Ser. No. 114,986
Int. Cl.[5] A01N *1/02*; C12Q *1/00, 1/02*; C12N *5/00*
U.S. Cl. 435—2 12 Claims

1. An in vitro screening test for identifying mutagenic and genotoxic agents during spermatogenesis, comprising:

(1) Culturing Xenopus testis explants in vitro in the presence of at least one suspected mutagenic and/or genotoxic agent;

(2) Separating said Xenopus testis explants from step (2) from said at least one suspected mutagenic and/or genotoxic agent;

(3) Culturing said Xenopus testis explants from step (2) in the absence of said at least one suspected mutagenic and/or genotoxic agent such that spermatogonia in said Xenopus testis explants undergo spermatogenesis;

(4) Isolating at least one type of spermatogenic cell at timed intervals during said step (3); and

(5) Determining the mutagenic and/or genotoxic affect of said at least one suspected mutagenic and/or genotoxic agent.

9. A serum-free media formulation for culturing Xenopus testis explants comprising one member selected from the group consisting of medium 1 and medium 2:

Serum-Free Media Formulations (mg/L)

Medium 1:			
NaCl	3786	Proline	60
KCl	186	Serine	240
$Na_2HPO_4.12H_2O$	358	Threonine	70
$CaCl_2.2H_2O$	147	Tryptophan	20
$MgCl_2.6H_2O$	102	Tyrosine	40
$MgSO_4.7H_2O$	123	Valine	60
$FeSO_4$	0.834	Glucose	1000
HEPES (pH 7.4)	3576	Oxaloacetate	152
Alanine	130	Sodium Pyruvate	110
Arginine-HCl	140	Bovine Serum Albumin (fatty acid-free)	1000
Aspartate-Mg	450		
Cysteine-HCl.H_2O	20	Transferrin (human)	10
Cystine	10	Basal Medium Eagles Vitamin Mix	(1X)
Glutamate-HCl	1200	Ascorbate	50
Glutamine	292	DL-a-Tocopherol	0.2
Glycine	60	Retinol	0.029
Histidine-HCl.H_2O	60	Bovine Insulin (Zn)	10
Isoleucine	50	Dihydrotestosterone	0.03
Leucine	80	Testosterone	0.03
Lysine-HCl	280	Follicle-Stimulating Hormone	5
Methionine	50	Antibiotic-	(1X)
Phenylalanine	50	Antimycotic Mix (100 units/ml penicillin; 100 mcg/ml streptomycin sulfate; 0.25 mcg/ml Fungizone)	

Medium 2:

Medium 1 - not containing tocopherol, ascorbate and testosterone, supplemented with linoleic acid (5 μg/ml).

4,929,543

PROCESS FOR THE DETERMINATION OF AN ANTIBODY IN HUMAN BODY FLUIDS

Rosemarie Kientsch-Engel, Pähl; Walter Wörner, Weilheim, and Gerd Kleinhammer, Tutzing, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

Filed May 12, 1988, Ser. No. 192,957
Claims priority, application Fed. Rep. of Germany, May 14, 1987, 3716217; Jan. 4, 1988, 3800048
Int. Cl.[5] G01N *33/563, 33/543, 33/544, 33/53*
U.S. Cl. 435—5 14 Claims

1. In a method for determining an antibody in a sample of body fluid wherein said sample is incubated with two receptors R_1 and R_2, wherein R_1 has an antigenic determinant which binds to said antibody to be determined and R_2 is labelled with a label which gives a detectable signal so as to form (i) a complex of label and bound antibody and (ii) uncomplexed label, and measuring label in said complex or uncomplexed label as a measurement of said antibody, the improvement comprising comparing said measurement to a control measurement obtained by incubating R_1 and R_2 with a conjugate of (i) a non-human antibody, an Fab fragment of said non-human antibody of an $F(ab')_2$ fragment of said non-human antibody and (ii) a human immunoglobulin or an Fc portion of said human immuno-globulin, wherein said non-human antibody, Fab, or $F(ab')_2$ fragment binds to the same receptor as the antibody to be determined and measuring complexed or uncomplexed label, and comparing said control measurement to said sample measurement as a measure of antibody in said sample.

4,929,544

REAGENTS, METHODS, AND TEST KIT FOR DIAGNOSING/MONITORING CANCER IN HUMANS

Barbara S. Vold, Menlo Park, Calif., assignor to SRI International, Menlo Park, Calif.

Continuation-in-part of Ser. No. 532,998, Sep. 16, 1983, Pat. No. 4,665,018, which is a continuation-in-part of Ser. No. 371,287, Apr. 23, 1982, abandoned. This application Aug. 27, 1986, Ser. No. 900,634
The portion of the term of this patent subsequent to May 21, 2004, has been disclaimed.
Int. Cl.[5] G01N *33/577, 33/574*
U.S. Cl. 435—6 20 Claims

1. A method for detecting cancer in a human patient comprising:

(a) determining the amount of N-[8 9-(beta-D-ribofuranosyl)purin-6-ylcarbamoyl[9 -L-threonine (t^6A) in a specimen of physiological fluid from the patient by a quantitative immiunoassay in which the specimen is incubated with a monoclonal antibody that specifically binds t^6A; and

(b) then comparing said amount with the standard amount of t^6A present in corresponding physiological fluid of normal human subjects to determine whether said amount is substantially greater than the standard amount, a substantially greater amount being an indication of the presence of cancer.

4,929,545

METHOD AND REAGENT FOR DETERMINATION OF AN ANALYTE VIA ENZYMATIC MEANS USING A FERRICYANIDE/FERRIC COMPOUND SYSTEM

Helmut Freitag, Indianapolis, Ind., assignor to Boehringer Mannheim Corporation, Indianapolis, Ind.

Filed Apr. 14, 1989, Ser. No. 339,051
Int. Cl.[5] C12Q *1/58*
U.S. Cl. 435—11 23 Claims

1. Composition useful in determining an analyte in a sample, comprising:

(a) an enzyme which specifically reacts with said analyte;

(b) a soluble ferricyanide compound which is reducible in

the presence of an electron to produce a ferrocyanide compound;

(c) a soluble ferric compound which reacts with a ferrocyanide compound to form a reaction product therebetween, and

(d) a buffer which does not prevent formation of said reaction product, wherein said composition has a pH of from about 3.0 to about 6.0.

4,929,546

TEST SET AND A PROCESS FOR THE DETERMINATION OF ANTIBIOTICS IN MILK AND A NOVEL STREPTOCOCCUS THERMOPHILUS STRAIN TO BE USED THEREIN

Annika Mayra-Makinen, Helsinki, Finland, assignor to Valio Meijerien Keskusosuusliike, Helsinki, Finland

Filed Apr. 6, 1988, Ser. No. 178,257

Claims priority, application Finland, Apr. 7, 1987, 871512

Int. Cl.[5] C12Q *1/02*

U.S. Cl. 435—29 **25 Claims**

9. A process for determining the presence of antibiotics in milk comprising the steps of:

(a) adding a sample of milk to a test set comprising a *Streptococcus thermophilus* T101, DSM 4022 concentrate and a water-based protective agent,

(b) adding an indicator to said test set,

(c) incubating the test set and the sample, and (d) evaluating the color of the test set, wherein a color change is an indication of the presence of an antibiotic in the milk sample.

4,929,547

ANTITUMOR PROTEIN GENE OF STREPTOCOCCUS PYOGENES SU, PLASMIDS CONTAINING THE GENE, TRANSFORMANT CELLS HARBORING THE PLASMIDS, AND PROCESS FOR PRODUCING THE ANTITUMOR PROTEIN

Masaharu Kanaoka, Toyonaka; Chigusa Kawanaka, Kobe; Takaharu Negoro, Takarazuka, and Hideo Agui, Ikeda, all of Japan, assignors to Ohgen Research Laboratories, Limited, Ishikawa, Japan

Filed Dec. 24, 1986, Ser. No. 946,025

Claims priority, application Japan, Dec. 28, 1985, 60-298014; Aug. 21, 1986, 61-194077

Int. Cl.[5] C12P *1/00*; C12N *5/00, 1/22, 1/20*

U.S. Cl. 435—69.1 **12 Claims**

1. Isolated DNA coding for antitumor protein produced by *Streptococcus pyogenes* which is characterized in that the DNA sequence coding for the antitumor protein is specified by the amino acid sequence described in FIG. 2.

4,929,548

SUBSTANCE GIF-2 AND PROCESS FOR PRODUCTION OF THE SAME

Sachio Wakayama, Tokyo; Fumiyasu Ishikawa, Kanagawa, and Kunio Oishi, Tokyo, all of Japan, assignors to Kibun Co., Ltd., Tokyo, Japan

Division of Ser. No. 807,066, Nov. 27, 1985, Pat. No. 4,771,121. This application Dec. 2, 1987, Ser. No. 128,338

Claims priority, application Japan, Apr. 25, 1984, 59-82000; PCT Int'l Appl., Mar. 29, 1985, PCT/JP85/00154

Int. Cl.[5] C12P *21/00, 21/02*; C12N *1/20*

U.S. Cl. 435—71.2 **1 Claim**

1. A process for producing the substance GIF-2 which comprises culturing bacteria capable of producing GIF-2 and belonging to species *Bacillus cereus* Ferm BP-746 under conditions sufficient to produce GIF-2 and recovering GIF-2 from the culture medium.

4,929,549

5-CARBAMOYLTHIENO[2,3-B]THIOPHENE-2-SULFONAMIDES AS TOPICALLY ACTIVE CARBONIC ANHYDRASE INHIBITORS

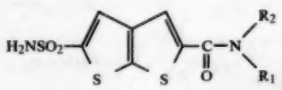
George D. Hartman, Lansdale, and John D. Prugh, Chalfond, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Feb. 8, 1989, Ser. No. 307,800

Int. Cl.[5] C07D *295/12, 265/30, 495/02*

U.S. Cl. 514—227.8 **6 Claims**

1. A compound of structural formula:



or ophthamologically or pharmaceutically acceptable salt thereof, wherein

R_1 and R_2 are independently selected from hydrogen or C_{1-6} straight or branched alkyl, either unsubstituted or substituted with:

(a) amino;

(b) di(C_{1-3} alkyl)amino;

(c) [C_{1-3} alkoxy-C_{2-4} alkyl]amino;

(d) di[(C_{1-3} alkoxy)-C_{2-4} alkyl]amino;

(e) di[C_{1-3} alkoxy-(C_{2-4} alkoxy)$_n$(C_{2-6} alkyl)]-amino, wherein n=1–4;

(f) C_{1-4} alkoxy;

(g) C_{1-4} alkoxy-(C_{2-4} alkoxy)$_n$, wherein n=1–4;

(h) C_{1-6} alkylamino-(C_{2-4} alkoxy)$_n$, wherein n=1–4;

(i) hydroxy;

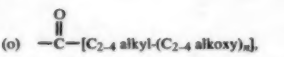
(j) C_{1-3} alkylsulfonyl;

(k) C_{1-3} alkylsulfinyl;

(l) morpholino;

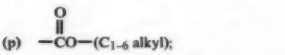
(m) thiomorpholino

(n) thiomorpholino-S-oxide;

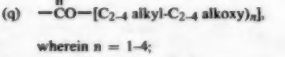


(o) $-C-[C_{2-4}\text{ alkyl-}(C_{2-4}\text{ alkoxy})_n]$,

wherein n = 1–4;



(p) $-CO-(C_{1-6}\text{ alkyl})$;



(q) $-CO-[C_{2-4}\text{ alkyl-}C_{2-4}\text{ alkoxy})_n]$,

wherein n = 1–4;

(r) [(C_{1-3} alkoxy)(C_{2-4} alkoxy)(C_{1-3} alkyl)][(C_{1-3} alkoxy)(C_{1-3} alkyl] amino;

(s) [(C_{1-3} alkoxy)(C_{2-4} alkoxy)(C_{1-3} alkyl)] amino; or

(t) [(C_{1-3} alkoxy)(C_{2-4} alkyl)][(C_{1-3} alkyl)] amino (C_{1-3} alkoxy);

provided that no more than one heteroatom is bonded to any one carbon.

4,929,550

PROCESS FOR THE PRODUCTION OF MICROBIAL CELLULOSE

David Byrom, Middlesbrough, England, assignor to Imperial Chemical Industries plc, London, England

Filed Jan. 19, 1988, Ser. No. 145,819

Claims priority, application United Kingdom, Jan. 22, 1987, 8701396

Int. Cl.[5] C12P *19/04*; C12R *1/02*

U.S. Cl. 435—101 **7 Claims**

1. A process for the production of extra-cellular microbial cellulose in which a bacterial strain capable of producing

extra-cellular microbial cellulose is aerobically cultivated in a culture medium containing a carbon source wherein the process comprises the steps:

(a) a growth step in which the bacterial strain is cultivated at a temperature within the range 15° C. to 35° C. and an initial pH within the range 4 to 6.5 in stirred batch culture until substantially all the carbon source present has been utilized and the culture is carbon limited;

(b) an accumulation step carried out at a temperature within the range 15° C. to 35° C. and an initial pH within the range 4 to 6.5 in which the carbon source is supplied continuously to the carbon limited culture at a rate sufficient to maintain it in the supernatant at a level not greater than 0.5 g/l and to maintain the culture in carbon limitation thereby enabling microbial cellulose to accumulate during stirred cultivation;

(c) a removal step in which bacterial cells and accumulated microbial cellulose are removed from the culture at the end of the accumulation step; and

(d) a separation step in which microbial cellulose is separated from the cells.

4,929,551

PROCESS FOR PRODUCING L(−)-TETRAHYDROFOLIC ACID

Tamotsu Eguchi; Takashi Oshiro, both of Machida; Yukihiro Kuge, Osakasayama; Kenichi Mochida, Hiratsuka, and Takayuki Uwajima, Machida, all of Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan

Filed Aug. 15, 1989, Ser. No. 393,795

Claims priority, application Japan, Aug. 30, 1988, 63-216045

Int. Cl.[5] C12P *13/04*; C12N *9/06*

U.S. Cl. 435—106 **7 Claims**

1. A process for producing L(−)-tetrahydrofolic acid which comprises allowing dihydrofolate reductase to act upon dihydrofolic acid in the presence of (1) NADP or NADPH, (2) glucose and (3) glucose dehydrogenase in an aqueous solution; accumulating L(−)-tetrahydrofolic acid in the aqueous solution; and recovering the L(−)-tetrahydrofolic acid therefrom.

4,929,552

CHEMICAL AND ENZYMATIC PROCESS FOR THE DENITRATION OF DIETHYLENEGLYCOL DINITRATE, NITROGLYCERIN AND OTHER NITRATE ESTERS

Kenneth Gold, Hastings-On-Hudson, N.Y., and Bruce Brodman, Stroudsburg, Pa., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Continuation of Ser. No. 87,942, Aug. 17, 1987, abandoned. This application Nov. 17, 1989, Ser. No. 438,955

Int. Cl.[5] C12P *13/00*

U.S. Cl. 435—128 **5 Claims**

1. An improved process of denitrating the dinitrate ester of diethyleneglycol comprising introducing the dinitrate ester of diethyleneglycol into an aqueous phosphate buffer containing the tripeptide reduced glutathione and the enzyme glutathione S-transferase.

4,929,553

PROTEASE FOR SPECIFIC PROCESSING OF SECRETED PROTEINS

Howard Bussey, Westmount, Canada; Aleksandra Dmochowska, Warsaw, Poland; David Y. Thomas, and Daniel Dignard, both of Montreal, Canada, assignors to Canadian Patents & Development Ltd., Ottawa, Canada

Filed May 29, 1987, Ser. No. 55,555

Int. Cl.[5] C12N *15/00, 1/00*; C12P *21/02*

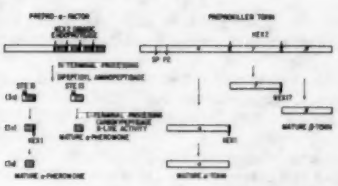
U.S. Cl. 435—172.3 **8 Claims**

6. A method for the specific processing of precursors of cellular secreted proteins comprising:

(a) providing one of (i) a recombinant vector comprising a DNA KEX1 gene sequence and a second recombinant vector comprising a DNA sequence encoding a precursor of a cellular secreted protein, containing basic amino acid residues at the COOH-terminal and requiring KEX-1-dependent removal of said amino acids for activity, or (ii) a single recombinant vector comprising both said sequences;

(b) transforming a yeast host organism with the recombinant vector or vectors of step (a);

(c) culturing the transformed host cells whereby the DNA



of the recombinant vector or vectors express both the encoded KEX1 product and the precursor of the cellular secreted protein;

(d) processing said precursor to said cellular secreted protein whereby the basic amino acid residues at the COOH terminal are removal and whose removal is KEX1-dependent; and

(e) recovering said cellular secreted protein from the medium.

4,929,554

HUMAN IMMUNE INTERFERON

David V. Goeddel, 1449 Benito, Burlingame, Calif. 94010, and Patrick W. Gray, 1836 16th Ave., San Francisco, Calif. 94122

Continuation of Ser. No. 746,813, Jun. 20, 1985, Pat. No. 4,762,791, which is a continuation of Ser. No. 312,489, Oct. 19, 1981, abandoned. This application Sep. 4, 1987, Ser. No. 94,477

The portion of the term of this patent subsequent to Aug. 9, 2005, has been disclaimed.

Int. Cl.[5] C12N *15/00, 5/00, 1/20*; C12P *21/00, 21/02*; C07H *21/04*

U.S. Cl. 435—172.3 **2 Claims**

1. A process for producing a replicable expression vehicle capable, in a transformant microorganism or cell culture, of expressing a polypeptide comprising the amino acid sequence of des-CYS-TYR-CYS recombinant human immune interferon, the process comprising constructing a first DNA sequence coding for said polypeptide and operably linking said first DNA sequence with a second DNA sequence capable of effecting expression of said first DNA sequence.

2. A process for producing a replicable expression vehicle capable, in a transformant microorganism or cell culture, of expressing a polypeptide comprising the amino acid sequence of recombinant human immune interferon, the process comprising constructing a first DNA sequence coding for said polypeptide and operably linking said first DNA sequence with a second DNA sequence capable of effecting expression of said first DNA sequence.

4,929,555

PICHIA TRANSFORMATION

James M. Cregg, and Kevin J. Barringer, both of San Diego, Calif., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 19, 1987, Ser. No. 110,148

Int. Cl.[5] C12N *15/00, 5/00*

U.S. Cl. 435—172.3 **23 Claims**

1. A method for making whole cells of *Pichia pastoris* competent for transformation which comprises maintaining said cells in suspension for a period of from 45 to 120 minutes at a cell concentration in the range of 5×10^7 to 5×10^8 per ml in an

aqueous solution of a non-toxic salt of an alkali metal selected from LiCl and Li_2SO_4 at a concentration of between 50 mM and about 500 mM, said solution being maintained at a temperature in the range of about 27° C.–33° C. and buffered at a pH in the range of about 7 to about 8.

4,929,556

ENZYME IMMOBILIZATION WITH POLYSULFONIUM SALTS

Roberta C. Cheng; Ritchie A. Wessling, and Donald L. Schmidt, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

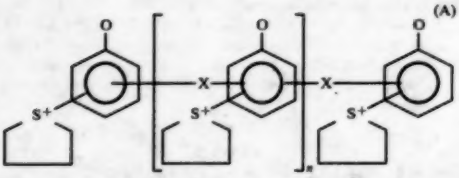
Continuation-in-part of Ser. No. 826,639, Feb. 6, 1986, abandoned. This application Jul. 8, 1988, Ser. No. 216,916

Int. Cl.[5] C12N *11/08, 9/92, 11/04;* **C12P** *19/24*

U.S. Cl. 435—180 **10 Claims**

1. A process for immobilizing an enzyme or cellular material containing said enzyme which comprises:

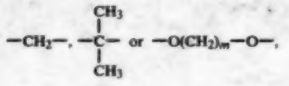
(a) forming a mixture by contacting said enzyme or cellular material with a water-compatible, chemically reactive polysulfonium salt selected from the group consisting of



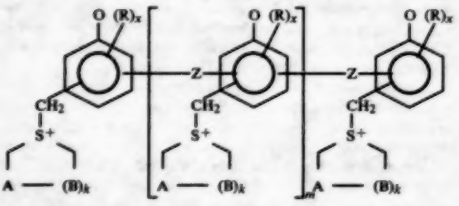
wherein:

n represents an integer of from 0 through 5;

X represents a covalent bond,



in which m is an integer of from 1 through 6; and

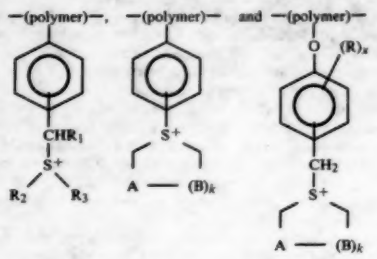


wherein:

Z represents a covalent bond, —O—, —S—, —CH_2—, —CHR′—, —CR'_2—, where R′ is C_1–C_4 alkyl, or Z represents —O—[$C_aH_{2a-b}(OH)_b$]—O— where a is an integer from 1 through 6, and b is an integer of from 0 through 4;

each R independently represents chloro, hydroxyl, C_1–C_4 alkyl or C_1–C_4 alkoxy; x represents an integer of from 0 through 2; A and B each independently represent —CH_2— or —CHR″—, where each R″ independently represents hydrogen, hydroxyl or C_1–C_8 alkyl; k represents the integer 1 or 2; and m is an integer of from 0 through 20; and

(C) a polysulfonium salt polymer containing 2 or more reactive sulfonium groups selected from the group consisting of



wherein:

R_1 independently represents hydrogen or methyl;

R_2 and R_3 each independently represent C_1–C_4 alkyl or C_1–C_4 hydroxyalkyl;

R independently represents chloro, hydroxyl, C_1–C_4 alkyl, C_1–C_4 hydroxyalkyl or C_1–C_4 alkoxy;

x represents an integer of from 0 through 2;

A and B each independently represent —CH_2— or —CHR″— in which R″ is independently hydrogen, hydroxyl or C_1–C_8 alkyl; and k represents the integer 1 or 2; and

(b) subjecting the mixture to conditions wherein the sulfonium ions react with nucleophilic groups contained by the enzyme or cellular material present in the mixture to form covalently cross-linked and water-insoluble products.

4,929,557

THERMOSTABLE AMYLASES AND PULLULANASES FROM TWO ANAEROBIC MICROORGANISMS

Garabed Antranikian, and Gerhard Gottschalk, both of Goettingen, Fed. Rep. of Germany, assignors to Kali-Chemie AG, Hanover, Fed. Rep. of Germany

Filed Mar. 31, 1988, Ser. No. 176,344

Claims priority, application Fed. Rep. of Germany, Apr. 9, 1987, 3712051

Int. Cl.[5] C12N *9/28*

U.S. Cl. 435—202 **27 Claims**

1. A preparation comprising at least one type of excretable, thermostable, amylolytic enzyme produced by a process comprised of the steps of (a) continuously culturing in a medium, under anaerobic conditions, a species of thermophilic anaerobic bacteria capable of excreting at least one type of amylolytic enzyme into the medium, and then (b) separating the bacteria from the medium, wherein said species of bacteria is selected from the group consisting of *Thermoanaerobacter finii* and *Thermobacteroides acetoethylicus,* and said medium comprises a nitrogen source, mineral salts and a carbon source that comprises an amount of a higher saccharide limiting to the growth of said bacteria.

4,929,558

CULTURE OF STRAIN OF BACILLUS BACTERIA FOR PRODUCING SOYBEAN PROTEIN CLOTTING ENZYME

Tatuo Emura, Sapporo, and Kiyoshi Ohba, Chitose, both of Japan, assignors to Kabushiki Kaisha Hokkaido Nissin, Hokkaido, Japan

Filed Mar. 29, 1989, Ser. No. 330,004

Int. Cl.[5] C12N *1/22;* **C12R** *1/07*

U.S. Cl. 435—252.5 **1 Claim**

1. A substantially pure culture of strain of bacteria belonging to the genus Bacillus and designated FERM BP-1778.

4,929,559
DNA CONTAINING THE PROLIPOPROTEIN SIGNAL PEPTIDASE GENE

Shoji Mizushima, and Hideo Yamagata, both of Nagoya, Japan, assignors to Sankyo Company Limited, Tokyo, Japan

Continuation of Ser. No. 634,441, Jul. 25, 1984. This application Feb. 23, 1988, Ser. No. 161,414

Claims priority, application Japan, Sep. 27, 1983, 58-179046

Int. Cl.[5] **C12N** *1/20, 15/00;* **C07H** *15/12*

U.S. Cl. 435—252.33 **15 Claims**

1. An isolated and purified DNA sequence coding for the prolipoprotein signal peptidase of *E. coli* and wherein said sequence is separate from the native *E. coli* chromosome and its native *E. coli* plasmid.

4,929,560
RECOVERY OF TISSUE PLASMINOGEN ACTIVATOR

Timothy Edmunds, Weymouth, and Susan F. Foley, Brighton, both of Mass., assignors to Damon Biotech, Inc., Needham Heights, Mass.

Filed Feb. 3, 1988, Ser. No. 151,707

Int. Cl.[5] **C12N** *9/64, 9/48, 9/50*

U.S. Cl. 435—226 **13 Claims**

1. A method for extracting tissue plasminogen activator (tPA) from a solution of tPA and other proteins, said method comprising the steps of:

(a) containing a tPA-containing protein matrix under conditions in which tPA in solution with a particulate, silicaceous said solution binds to said matrix, said matrix comprising the covalently bound, carboxylated reaction product of said particulate, silicaceous matrix with polyethyleniminopropyl trimethoxy silane;

(b) separating unbound protein from said matrix; and

(c) releasing tPA from said matrix.

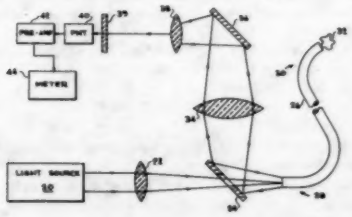
4,929,561
ABSORPTION-EMISSION OPTRODE AND METHODS OF USE THEREOF

Tomas B. Hirschfeld, Livermore, Calif., assignor to Regents of the University of California, Oakland, Calif.

Filed Aug. 8, 1985, Ser. No. 763,557

Int. Cl.[5] **G01N** *21/64, 21/65*

U.S. Cl. 436—116 **39 Claims**



1. A method for monitoring physical and chemical parameters of a sample substance and for generating a signal related to said physical and chemical parameters, the method comprising the steps of:

immobilizing on a substrate, a fluorescent substance having an emission band and an absorption band;

immobilizing on the same substrate, an absorber substance having an absorption band overlapping the emission band of the fluorescent substance, the degree of overlap being responsive to the physical and chemical parameters of the sample substance, and the absorber substance being immobilized such that an effective number of molecules of the absorber substance are closely adjacent to an effective number of molecules of the fluorescent substance to produce detectable resonant energy transfer therebetween;

contacting the substrate with the sample substance;

illuminating the fluorescent substance with an illumination beam having a frequency within the sbsorption band of the fluorescent substance, so that excited fluorescent states are generated in the fluorescent substance;

detecting a signal resulting from the decay of the excited fluorescent states;

providing a fiber optic through which said illumination beam is transmitted from a first end of the fiber optic to a second end of the fiber optic;

attaching said substrate to the second end of the fiber optic such that light from said illumination beam emanating from the second end of the fiber optic illuminates said fluorescent substance and such that said resulting signal is collected by the second end of the fiber optic and transmitted to the first end of the fiber optic;

separating at the first end of the fiber optic said illumination beam from said resuting signal;

measuring the intensity of backscattered Raman emissions from the fiber;

forming a ratio of the resulting signal to the backscattered Raman intensity;

extracting information concerning the physical and chemical parameters of the sample substance from the ratio.

4,929,562
METHOD AND APPARATUS FOR DETECTING GEM-POLYHALOGENATED HYDROCARBONS

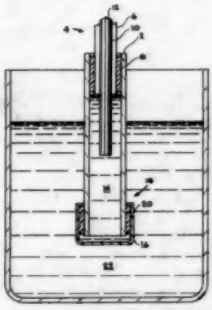
William G. Anderson, deceased, late of Livermore, and Johanna S. Anderson, legal representative, Palm Spring, both of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Filed Aug. 20, 1986, Ser. No. 898,078

The portion of the term of this patent subsequent to Dec. 29, 2005, has been disclaimed.

Int. Cl.[5] **G01N** *33/48, 21/78*

U.S. Cl. 436—126 **20 Claims**



1. A method of detecting gem-polyhalogenated hydrocarbons, the method comprising the steps of:

combining a pyridine reaction constituent selected from the

group consisting of pyridine and derivatives thereof with an aqueous solution of a hindered nitrogen base to form a reaction mixture, the reaction mixture comprising the pyridine reaction constituent at a concentration in the range of between 60 to about 96 percent by volume of the reaction mixture, the remaining volume comprising the aqueous solution such that the hindered nitrogen base is present in the reaction mixture at a concentration in the range of between about 0.01–0.05 molar, the hindered nitrogen base being selected from the group consisting of the formula:

wherein R_1, R_2, R_3, and R_4 are substituents independently selected from the group consisting of lower alkyl, hydroxy-substituted lower alkyl, phenyl, lower alkyl-substituted phenyl, and phenyl-substituted lower alkyl;

reacting the reaction mixture with a gem-polyhalogenated hydrocarbon to form a reaction product which is at least one of fluorescent and chromogenic;

illuminating the reaction product with an illumination beam; and

detecting the gem-polyhalogenated hydrocarbon by at least one of the fluorescence and absorbance of the reaction product.

15. An apparatus for monitoring the concentration of gem-polyhalogenated hydrocarbons in a sample fluid, the apparatus comprising:

a fiber optic through which an illumination beam from an associated light source is transmitted from a first end of the fiber optic to a second end of the fiber optic;

a reaction mixture held adjacent to the second end of the fiber optic such that light from the illumination beam emanating from the second end of the fiber optic illuminates a portion of the reaction mixture causing it to produce a fluorescent signal related to the concentration of gem-polyhalogenated hydrocarbons when the second end of the fiber optic is immersed in a sample fluid, the reaction mixture comprising an aqueous solution of a pyridine reaction constituent selected from the group consisting of pyridine and derivatives thereof at a concentration in the range of between about 60 to about 96 percent by volume of the reaction mixture, and a hindered nitrogen base at a concentration in the range of between about 0.01 to 0.05 molar, the hindered nitrogen base being selected from the group consisting of the formula

wherein R_1, R_2, R_3, and R_4 are substituents independently selected from the group consisting of lower alkyl, hydroxy-substituted lower alkyl, phenyl, lower alkyl-substituted phenyl, and phenyl-substituted lower alkyl;

means attached to the second end of the fiber optic for holding the reaction mixture adjacent the second end of the fiber optic and for separating the reaction mixture from a sample fluid whenever the second end of the fiber optic is immersed in a sample fluid;

means adjacent to the first end of the fiber optic for separating light from the associated light source from the fluorescent signal collected and transmitted by the fiber optic; and

detection means adjacent to the separation means for collecting and analyzing the fluorescent signal generated by the reaction mixture.

4,929,563

METHOD OF MANUFACTURING SEMICONDUCTOR DEVICE WITH OVERVOLTAGE SELF-PROTECTION

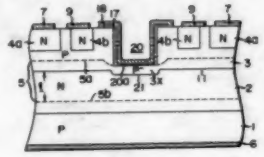
Yoshiaki Tsunoda, Kawasaki, and Masatoshi Kanaya, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 18, 1988, Ser. No. 272,842

Claims priority, application Japan, Nov. 21, 1987, 62-294364

Int. Cl.[5] H01L *21/223, 21/265*

U.S. Cl. 437—6 13 Claims



1. A method of manufacturing a semiconductor device with overvoltage self-protection, comprising a four-layer structure extending from a top surface to a bottom surface of a semiconductor substrate and including an emitter layer of one conductivity type, a gate-base layer of an opposite conductivity type, a base layer of said one conductivity type and another emitter layer of said opposite conductivity type, said method comprising the steps of:

a first step of making a recess in said gate-base layer from its surface exposed to the top surface of said substrate, the depth of said recess being such that the bottom of said recess reaches at least a space-charge layer produced in said gate-base layer when a predetermined forward voltage is applied to said semiconductor device, and further extends close to a junction between said base layer and said gate-base layer;

a second step of doping said semiconductor substrate with impurities of said opposite conductivity type from the bottom of said recess to form a region under said recess having an impurity concentration lower than said gate-base layer, the amount of said impurities being substantially equal to $N_D \times l$ (atoms/cm^2) which is the product of the depth l (cm) of the space-charge layer produced in said base layer when the forward voltage is applied to said semiconductor device and a concentration N_D (atoms/cm^3) of impurities of said one conductivity type in said base layer; and

a third step of forming an electrode on the surface of said recess.

4,929,564

METHOD FOR PRODUCING COMPOUND SEMICONDUCTOR SINGLE CRYSTALS AND METHOD FOR PRODUCING COMPOUND SEMICONDUCTOR DEVICES

Keiji Kainosho; Haruhito Shimakura, and Osamu Oda, all of Toda, Japan, assignors to Nippon Mining Co., Ltd., Tokyo, Japan

Filed Oct. 16, 1989, Ser. No. 421,680

Claims priority, application Japan, Oct. 21, 1988, 63-265340; Dec. 28, 1988, 63-334588

Int. Cl.[5] H01L *21/265*

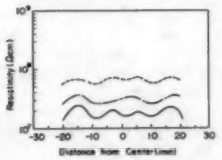
U.S. Cl. 437—20 4 Claims

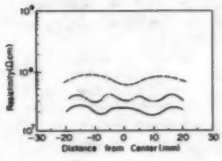
4. A method for producing compound semiconductor devices comprising;

(a) a heat-treatment step for heat-treating the wafers of a Fe-doped InP single crystal at temperatures ranging from 400° C. to 690° C.;

(b) a mirror surface polishing step for polishing said heat-treated wafers;

(c) an ion implantation step for implanting ions into said polished wafers; and





(d) an activating heat-treatment step for heat-treating said wafers at the temperature of 690° C. or lower.

4,929,565

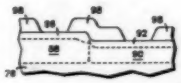
HIGH/LOW DOPING PROFILE FOR TWIN WELL PROCESS

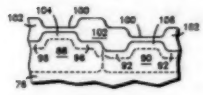
Louis C. Parrillo, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Division of Ser. No. 147,635, Jan. 25, 1988, Pat. No. 4,889,825, which is a division of Ser. No. 841,383, Mar. 4, 1986, abandoned. This application Oct. 30, 1989, Ser. No. 429,953

Int. Cl.[5] **H01L** *21/265, 27/00*

U.S. Cl. 437—34 **5 Claims**





1. A process for fabricating a CMOS integrated circuit having a high/low doping profile in each of twin wells comprising the steps of:

providing a semiconductor substrate having a surface;

blanket implanting the surface with first P-type ions;

forming a patterned layer of oxidation masking material over selected portions of the surface thereby leaving the substrate unmasked in non-selected portions;

thermally oxidizing the unmasked portions of the substrate to grow a first thick oxide and to incorporate therein first P-type ions from the unmasked portions of the substrate, thereby removing the first P-type ions from the unmasked portions of the substrate;

physically removing the first thick oxide and the first P-type ions incorporated therein;

implanting first N-type ions into the unmasked portions of the substrate;

driving in the first P-type and N-type ions to form P-type and N-type wells in the substrate having a first and a second selected depth, respectively;

implanting second N-type ions into the unmasked portions of the substrate and driving in the second N-type ions to form an N-type surface layer having a third selected depth less than the second selected depth, the N-type surface layer being laterally coextensive with the N-type well;

forming a second thick oxide over the N-type surface layer;

removing the patterned layer of oxidation masking material;

implanting second P-type ions using the second thick oxide as an implantation mask; and

driving in the second P-type ions to form a P-type surface layer having a fourth selected depth less than the first selected depth, the P-type surface layer being laterally coextensive with the P-type well.

4,929,566

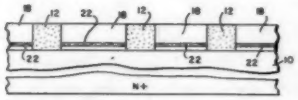
METHOD OF MAKING DIELECTRICALLY ISOLATED INTEGRATED CIRCUITS USING OXYGEN IMPLANTATION AND EXPITAXIAL GROWTH

Bruce A. Beitman, Palm Bay, Fla., assignor to Harris Corporation, Melbourne, Fla.

Filed Jul. 6, 1989, Ser. No. 376,019

Int. Cl.[5] **H01L** *21/20, 21/265, 21/76*

U.S. Cl. 437—24 **9 Claims**



1. A method of forming an integrated circuit having laterally dielectrically isolated islands comprising:

forming a first insulative layer of a first thickness on a substrate;

patterning said first insulating layer to form lateral dielectric walls and exposed island areas of said substrate;

epitaxially growing islands of a first conductivity type on exposed island areas of said substrate to a second thickness less than said first thickness;

implanting an oxygen into said epitaxial island to form a horizontal dielectric isolation wall extending lateral between said lateral dielectric walls and displaced from a top surface of said epitaxial island to form totally dielectrically isolated islands; and

epitaxially increasing the total thickness of said islands to said first thickness subsequent to implanting said oxygen.

4,929,567

METHOD OF MANUFACTURING A SELF-ALIGNED GAAS MESFET WITH T TYPE TUNGSTEN GATE

Hyung M. Park, and Dong G. Kim, both of Daejeon, Rep. of Korea, assignors to Electronics and Telecommunications Research Institute, Daejeon and Korea Telecommunication Authority, Seoul, both of, Rep. of Korea

Filed Nov. 30, 1989, Ser. No. 443,750

Claims priority, application Rep. of Korea, Dec. 1, 1988, 1988-15986[U]

Int. Cl.[5] **H01L** *21/265*

U.S. Cl. 437—41 **4 Claims**

1. A method of manufacturing a self-aligned MESFET with T type gate electrode of the tungsten comprising the processes of:

depositing a silicon (Si) thin film onto entire surface of a semi-insulating GaAs substrate by PECVD(plasma enhanced chemical vapor deposition), depositing a Si_3N_4 film onto the silicon (Si) thin film by PCVD (photo chemical vapor deposition), and ion implanting for a n active layer using a photoresist as a mask;

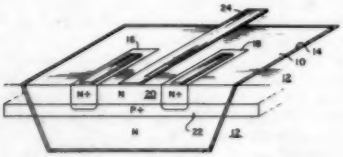
forming a gate electrode pattern by etching said Si_3N_4 film using a photoresist as a mask to form the gate electrode;
growing the tungsten by selective chemical vapor deposition only onto the exposed Si thin film in order not to deposit the tungsten onto said Si_3N_4 film;
growing the tungsten film transversely for forming a tungsten gate electrode with T type;
forming a n+ layer by ion implantation so that the gap between said gate electrode and said n+ layer is 1000 Å through 2000 Å using said T type tungsten gate;
activating said n and n+ layer using said Si thin film and Si_3N_4 film as a capping film;
ion implanting for said n and n+ active layers and for isolation between devices through said Si thin film and Si_3N_4 film;
etching said Si thin film and Si_3N_4 film and depositing an ohmic metal (AuGe/Ni) by a lift-off technique using a photoresist as a mask to form a source and a drain.

4,929,568

METHOD OF ISOLATING A TOP GATE OF A MESFET AND THE RESULTING DEVICE

James D. Beasom, Melb. Village, Fla., and William E. O'Mara, Jr., Kingston, N.H., assignors to Harris Corporation, Melbourne, Fla.

Filed Sep. 11, 1989, Ser. No. 405,282
Int. Cl.[5] H01L *21/265*
U.S. Cl. 437—40 **13 Claims**



1. A method of manufacturing an isolated top gate MESFET in an island of a first conductivity type isolated by dielectric isolation from a substrate comprising:
forming source and drain regions of said first conductivity type spaced in said island to define a channel therebetween;
forming a bottom gate region of a second conductivity type in and below the surface of said island;
removing said dielectric isolation at two opposing portions of said dielectric isolation adjacent said channel to a first depth from said surface; and
forming a top gate on said top surface of said island of a material which forms a Schottky barrier therewith and extends across a portion of said island forming said channel between said source and drain regions and beyond said two opposing portions of said dielectric isolation onto said substrate of a thickness small enough compared to said first depth to be disconnected at said dielectric isolation.

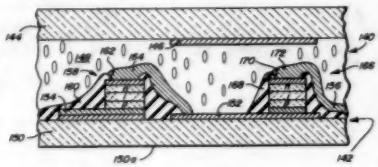
8. A method of manufacturing an isolated top gate MESFET in a silicon island of a first conductivity type isolated by dielectric isolation from a silicon substrate comprising:
forming source and drain regions of said first conductivity type spaced in said island to define a channel therebetween;
forming a bottom gate region of a second conductivity type in and below the surface of said island;
forming a mask over said island and substrate having an aperture which extends across a portion of said island forming said channel between said source and drain regions and beyond two opposing sides of said dielectric isolation onto said substrate;
forming a layer of gate material, whose silicide will form a Schottky barrier top gate with said channel, in said aperture;
heating to alloy said material with said island and substrate; and
selectively removing unalloyed portion of said material to form a Schottky barrier top gate with and extending totally across said channel and being discontinuous at said dielectric isolation.

4,929,569

METHOD OF FABRICATING AMORPHOUS SILICAN DIODE ADDRESSED LIQUID CRYSTAL DISPLAY

Zvi Yaniv, Southfield; Vincent D. Cannella, Birmingham, both of Mich.; Gregory L. Hansell, Camarillo, Calif., and Louis D. Swartz, Holly, Mich., assignors to Ovonic Imaging Systems, Inc., Troy, Mich.

Continuation of Ser. No. 82,266, Aug. 6, 1987, abandoned, which is a continuation of Ser. No. 675,941, Dec. 3, 1984, abandoned, which is a continuation-in-part of Ser. No. 573,004, Jan. 23, 1984, abandoned. This application Sep. 22, 1988, Ser. No. 247,815
Int. Cl.[5] H01L *45/00, 27/06*
U.S. Cl. 437—51 **19 Claims**



1. A method of making a display of the type including at least one pixel including at least one pair of isolation devices, said method comprising the steps of:
(A) providing an insulative substrate having a conductive layer thereover;
(B) depositing a first metal layer over said conductive layer;
(C) depositing a first doped semiconductor layer over said first metal layer;
(D) depositing a substantially intrinsic semiconductor layer over said first doped layer;
(E) depositing a second doped semiconductor layer over said intrinsic layer, said second doped layer being opposite in conductivity with respect to said first doped layer;
(F) depositing a second metal layer over said second doped semiconductor layer;
(G) removing portions of said second metal layer for providing discrete portions of said second metal layer to define the location of said isolation devices;
(H) removing portions of said semiconductor layers while using at least said second metal discrete portions as a mask to form said isolation devices;
(I) removing portions of said first metal layer to form a first address lead with at least one of said isolation devices electrically connected thereto;
(J) removing portions of said conductive layer to form a first pixel electrode with the other of said isolation devices electrically connected thereto;
(K) forming an interconnect lead to electrically couple said

at least one isolation device on the side thereof opposite said first address lead to said first pixel electrode;

(L) forming a second address lead insulated from said first address lead and electrically coupled to said at least one other isolation device on the side thereof opposite said first pixel electrode;

(M) forming a second pixel electrode spaced from and substantially parallel to said first pixel electrode; and

(N) applying light influencing material between said pixel electrodes.

4,929,570

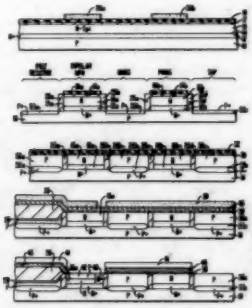
SELECTIVE EPITAXY BICMOS PROCESS

Paul J. Howell, Federal Way, Wash., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Continuation-in-part of Ser. No. 239,052, Aug. 29, 1988, abandoned, which is a continuation-in-part of Ser. No. 915,450, Oct. 6, 1986, abandoned. This application Jan. 19, 1989, Ser. No. 300,163

Int. Cl.[5] **H01L** *21/265*

U.S. Cl. 437—89 **24 Claims**



1. In a structure having a semiconductor substrate of first conductivity type, an epitaxial layer of second conductivity type, and a buried layer of second conductivity type separating the substrate from the epitaxial layer, a method of fabricating both bipolar and field effect transistors comprising:

(a) removing all of the epitaxial layer and all of the buried layer from first regions where first channel type field effect transistors are desired to thereby leave second regions of the epitaxial layer and buried layer having sidewalls protruding above the substrate, said step of removing further comprising the steps of:

(i) masking the second regions of the epitaxial layer with an etch-resistant material by forming a first layer of silicon dioxide on the epitaxial layer and a layer of silicon nitride on the silicon dioxide; and

(ii) etching the epitaxial layer and the buried layer to expose the substrate in the first regions;

(b) forming a layer of insulating material at least over the sidewalls of the second regions;

(c) depositing semiconductor material over at least the first regions to thereby reform the epitaxial layer over the first regions, the epitaxial layer in the second regions being separated from the epitaxial layer in the first regions by the insulating material;

(d) implanting first conductivity type impurity into the first regions, the second regions being protected by the layer of silicon nitride; and

(e) forming at least one first channel type field effect transistor in one of the first regions and one bipolar transistor in one of the second regions.

4,929,571

METHOD OF MAKING A BURIED CRESCENT LASER WITH AIR GAP INSULATOR

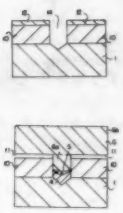
Etsuji Omura, and Hirofumi Namizaki, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Division of Ser. No. 130,426, Dec. 9, 1987, Pat. No. 4,847,949. This application Mar. 10, 1989, Ser. No. 321,775

Claims priority, application Japan, Feb. 27, 1987, 62-45632

Int. Cl.[5] **H01L** *21/20, 21/203*

U.S. Cl. 437—129 **5 Claims**



1. A method of producing a semiconductor laser comprising:

growing a current blocking layer on a first conductivity type semiconductor substrate;

depositing a selectively removable mask layer on said current blocking layer;

removing a portion of said mask layer to define a longitudinal window on said current blocking layer in a direction of a resonator of the laser;

selectively etching at the longitudinal window through the current blocking layer to said semiconductor substrate to form a longitudinal groove;

successively growing a first cladding layer and an active layer in said groove;

growing a second cladding layer on said active layer in said groove and on said mask layer outside said groove; and

removing said mask layer to leave a gap separating the second cladding layer from the current blocking layer outside said groove.

4,929,572

DOPANT OF ARSENIC, METHOD FOR THE PREPARATION THEREOF AND METHOD FOR DOPING OF SEMICONDUCTOR THEREWITH

Shigeaki Saito; Toshiharu Matsueda, both of Tokyo; Yoshihiro Kubota, Gunma, and Masaaki Iguchi, Tokyo, all of Japan, assignors to Furukawa Co., Ltd. and Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Jul. 17, 1989, Ser. No. 380,616

Claims priority, application Japan, Jul. 18, 1988, 63-178836

Int. Cl.[5] **H01L** *21/00, 21/02, 21/225, 21/22*

U.S. Cl. 437—164 **9 Claims**

1. A dopant body of arsenic for doping of a semiconductor which is a sintered body of a powder mixture comprising 100 parts by weight of a powder of silicon arsenide and from 100 to 300 parts by weight of a silica powder.

4,929,573

HIGHLY DENSIFIED BODIES FROM ORGANOPOLYSILOXANES FILLED WITH SILICON CARBIDE POWDERS

William H. Atwell; Gary T. Burns, and Chandan K. Saha, all of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Sep. 26, 1988, Ser. No. 249,036
Int. Cl.[5] C04B 35/52
U.S. Cl. 501—90 31 Claims

1. A method of preparing a sintered body of silicon carbide, said method comprising

(a) forming a handleable green body by

(i) preparing an intimate mixture consisting essentially of silicon carbide powder, a metal-containing sintering aid, and a preceramic organopolysiloxane, where the metal-containing sintering aid is present at 0.1 to 3.0 weight percent of the metal based on the weight of silicon carbide powder and where the preceramic organopolysiloxane is present at such a level that the free carbon value of the mixture is greater than 0.2 weight percent based on the total weight of the silicon carbide powder and the char derived from the preceramic organopolysiloxane and

(ii) then forming the intimate mixture into the desired shape under pressure at a temperature less than about 500° C. to obtain a handleable green body; and

(b) sintering the handleable green body in an inert atmosphere at a temperature greater than 1900° C. to obtain a sintered body of silicon carbide with a density greater than 2.4 g/cm^3.

4,929,574

ELECTROMAGNETIC WAVE ABSORBERS COMPRISED OF BARIUM TITANATE POWDERS

Alain Iltis, Aubervilliers, and Patrick Maestro, Fosses, both of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed Mar. 30, 1989, Ser. No. 330,484
Claims priority, application France, Mar. 30, 1988, 88 04168
Int. Cl.[5] C04B 35/46
U.S. Cl. 501—137 18 Claims

1. A composition of matter comprising an electromagnetic wave absorbing amount of finely divided barium titanate particulates homogeneously dispersed in a solid organic matrix material, the mean diameter of such barium titanate particulates being equal to or greater than 1 micron at least 50% by volume of such barium titanate particulates being in the quadratic crystalline state.

4,929,575

MELT PROCESSABLE, GREEN, CERAMIC PRECURSOR POWDER

Issam A. Khoury, Midland, Mich., and Horst G. Langer, Wayland, Mass., assignors to The Dow Chemical Company, Midland, Mich.

Filed Mar. 21, 1988, Ser. No. 171,099
Int. Cl.[5] C04B 35/46, 35/48, 35/49
U.S. Cl. 501—137 16 Claims

1. A melt processable, green ceramic precursor powder prepared by a process comprising (a) preparing a solution comprising a melt processable organic polymer and a metal polyahl coordination complex, and (b) drying the solution under conditions sufficient to form the melt processable, green ceramic precursor powder.

4,929,576

REACTIVATING CATALYSTS CONTAINING NOBLE METALS ON MOLECULAR SIEVES CONTAINING OXIDES OF ALUMINUM AND PHOSPHORUS

Ying-Yen P. Tsao, Lahaska, Pa., and Roland von Ballmoos, Hopewell, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 140,358, Jan. 4, 1988, abandoned. This application Mar. 15, 1989, Ser. No. 323,178
Int. Cl.[5] B01J 29/38, 23/94, 38/42
U.S. Cl. 502—35 20 Claims

1. A process for rejuvenating a deactivated noble metal-containing molecular sieve catalyst, said deactivated catalyst containing agglomerated platinum metal, said process comprising the steps of:

(i) dispersing said agglomerated platinum associated with the deactivated catalyst by contacting said catalyst with a stream of gas containing a sufficient amount of molecular chlorine under conditions and for a period of time sufficient to achieve dispersion of the platinum metal;

(ii) subsequently purging said catalyst with a purging gas; and

(iii) reducing said purged catalyst in the presence of dry hydrogen at an elevated temperature,

wherein said catalyst comprises a crystalline aluminum and phosphorus oxide-containing material, said crystalline material having a three-dimensional microporous crystal framework of corner-sharing oxide tetrahedra of the emperical formula:

$$(M_xAl_yP_z)O_2$$

where x is from 0 to 0.5, y is from 0.1 to 0.9 and z is from 0.1 to 0.9, wherein $x+y+z=1$, and where M represents at least one element other than Al or P capable of forming said three-dimensional oxide framework, wherein M is selected from the group consisting of Si, Mg, Mn, Co, Zn, Fe, Ti, and mixtures thereof.

4,929,577

TRANSPARENT WOUND DRESSINGS IN SHEET FORM

John Cornell, West Chester, Pa., assignor to Medi-Tech International Corporation, Brooklyn, N.Y.

Filed Mar. 11, 1987, Ser. No. 24,265
Int. Cl.[5] A61L 15/00
U.S. Cl. 514—58 9 Claims

1. A transparent gel composition for dressing skin wounds in the form of a sheet comprising:

(i) a dextrin; and

(ii) a water-swellable, cross-linked polymer selected from polyacrylamide or polymethacrylamide, wherein the ratio of dextrin to polymer is from about 2:1 to 1:1.

4,929,578

REFRACTORY FIBERS OF ALUMINA AND ORGANIC RESIDUE

Harold G. Sowman, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 49,017, May 7, 1987, Pat. No. 4,801,562, which is a continuation-in-part of Ser. No. 854,319, Apr. 21, 1986, abandoned. This application Nov. 1, 1988, Ser. No. 265,758
Int. Cl.[5] C04B 35/02
U.S. Cl. 501—95 12 Claims

1. An amorphous organic-inorganic hybrid fiber consisting essentially of 70 to 90 weight percent alumina and 10 to 30 weight percent of organic residue based on the total hybrid fiber composition, wherein said fiber contains alumina, carbon, and one element or group of elements selected from the group consisting of H, O, N, and Cl.

4,929,579

METHOD OF MANUFACTURING CAST FUSED SILICA ARTICLES

Perry B. Lassiter, Johnson City, Tenn., assignor to Premier Refractories & Chemicals Inc., King of Prussia, Pa.

Continuation of Ser. No. 212,825, Jun. 29, 1988, abandoned. This application Jun. 13, 1989, Ser. No. 366,295

Int. Cl.[5] C04B *35/14*

U.S. Cl. 501—133 17 Claims

1. In a method of producing a cast fused silica product wherein a flowable aqueous slurry of fine fused silica particles and a dry coarse fused silica aggregate are admixed and poured into a mold to form a cast product which is subsequently dried and sintered, the improvement comprising admixing additional fused silica particulate to the aqueous mixture of said fine fused silica slurry and said coarse fused silica aggregate to form a resultant aqueous casting mix prior to the pouring of the resultant aqueous casting mix into the mold, said additional fused silica particulate being added to the aqueous mixture of said fine fused silica slurry and said coarse fused silica aggregate to reduce the water content of the resultant aqueous casting mix to a water content ranging from about 7.5% to about 9.5% by weight, said additional fused silica particulate formed of dry agglomerates of fused silica particles having an agglomerated size less than about 100 mesh, said dry agglomerates of fused silica particles formed by drying an aqueous slurry having a water content less than about 20 percent by weight and including fine fused silica particles having a particle size ground to less than about 325 mesh, and dry grinding the resulting dried fused silica particles.

4,929,580

PROCESS FOR TREATING CLAY MINERALS

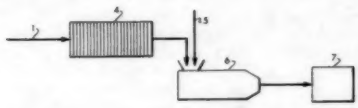
Thomas R. Jones, St. Austell, United Kingdom, assignor to ECC International Limited, United Kingdom

Continuation of Ser. No. 171,139, Mar. 16, 1988, abandoned, which is a continuation of Ser. No. 940,544, Dec. 12, 1986, abandoned. This application Jun. 15, 1989, Ser. No. 368,068

Claims priority, application United Kingdom, Dec. 9, 1985, 8531253

Int. Cl.[5] C04B *33/00*

U.S. Cl. 501—148 6 Claims



1. In the process for preparing a clay mineral which provides reduced viscosity when formed into an aqueous completely deflocculated paper coating suspension of a given solids content; which process includes the steps of (1) preparing a slurry of the clay mineral at 5 to 30% solids; (2) mixing the slurry and thereby said clay mineral with a minor proportion by weight of a water-soluble organic compound which is free of hydroxy or carboxylic acid groups and has a plurality of basic groups and a number average molecular weight not greater than 1000; (3) dewatering the mixed slurry to yield a filter cake of the clay mineral having a plastic consistency; (4) mechanically working the filter cake while in a plastic state containing from 22% to 50% by weight water, under conditions such that from 25 to 1000 KJ of energy per Kg of dry clay mineral are dissipated in the mixture; and (5) thermally drying the product from said mechanical working; THE IMPROVEMENT COMPRISING:

displaying the point of addition of said water-soluble organic compound to said mechanical working step (4), and effecting mixing of said compound and clay simultaneously with said working; thereby combining said mixing and working steps; said displacement of said addition point for said water-soluble organic compound acting further to reduce water retention in the said filter cake, thereby to reduce the quantity of heat energy required during said thermal drying step.

4,929,581

CATALYTIC DIESEL SOOT FILTER

Juergen Steinwandel; Juergen Haas, and Carsten Plog, all of Markdorf, Fed. Rep. of Germany, assignors to Dornier-System GmbH, Friedrichshafen, Fed. Rep. of Germany

Filed May 16, 1988, Ser. No. 194,606

Claims priority, application Fed. Rep. of Germany, May 16, 1987, 3716446

Int. Cl.[5] B01J *29/22, 35/04*

U.S. Cl. 502—2 11 Claims

1. Catalytically active coating of filter material for Dieselsoot filter characterized in that the coating is comprised of a zeolite having a pore diameter from 0.55 to 1.3 namometers, the zeolite being doped with a metal of the platinum group.

2. Catalytically-active coating in accordance with claim 1 characterized in that the coating is a zeolite of the mordenite group.

8. Catalytic dieselsoot filter characterized in that the catalytically-active coating in accordance with claim 1 is deposited as a structural strengthener of a filter element.

9. Catalytic filter in accordance with claim 8 characterized in that the filter element is a packing of minerals of metal wool of ceramic foam of a monolithic honeycomb structure or a monolithic honeycomb structure with alternating-closed channels.

4,929,582

HYDROUS OXIDE ION-EXCHANGE COMPOUND CATALYSTS

Robert G. Dosch, and Howard P. Stephens, both of Albuquerque, N. Mex., assignors to The United States of American as Represented by The United States Department of Energy, Washington, D.C.

Filed Apr. 9, 1986, Ser. No. 849,913

The portion of the term of this patent subsequent to Apr. 29, 2005, has been disclaimed.

Int. Cl.[5] B01J *21/06, 23/20*

U.S. Cl. 502—11 5 Claims

1. A catalytic material comprising a hydrous, alkali metal, alkaline earth metal, or quaternary ammonium titanate, zirconate, niobate, or tantalate, in which the metal or quaternary ammonium cations have been exchanged with a catalytically effective quantity of catalytically active metal cations, and which has been subsequently treated with a dilute aqueous solution of a Bronsted acid.

4,929,583

VANADIUM PASSIVATION IN A HYDROCARBON CATALYTIC CRACKING PROCESS

Eugene A. Pasek, Monroeville, and Norman C. Morgan, Ford City, both of Pa., assignors to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 752,994, Jul. 8, 1985, abandoned. This application Jun. 16, 1988, Ser. No. 207,604

Int. Cl.[5] B01J *29/06*

U.S. Cl. 502—64 3 Claims

1. A catalyst composition comprising a crystalline aluminosilicate zeolite, a matrix material, and from 5 to 40 weight percent, based on the total catalyst composition, of a vanadium passivator having a passivation factor of at least 2.0, the anion of said vanadium passivator to be of a weak non-volatile acid having a pKa >5 and the cation is a Group IIA metal having an atomic number greater than 20.

4,929,584

ALKYLATION OF BENZENE COMPOUNDS WITH DETERGENT RANGE OLEFINS

Lynn H. Slaugh, Cypress; Thomas H. Johnson, and Ronald J. Hoxmeier, both of Houston, all of Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Mar. 30, 1989, Ser. No. 330,516
Int. Cl.[5] B01J 31/14
U.S. Cl. 502—112 12 Claims

1. A catalyst composition prepared by reacting in a hydrocarbon solvent a molybdenum or tungsten halide with diethylaluminumtriethylsilaneolate.

4,929,585

MIXED-SOLID SOLUTION TRI-METALLIC OXIDE/SULFIDE CATALYST AND PROCESS FOR ITS PREPARATION

Anthony L. Lee, Glen Ellyn; Howard S. Meyer, Hoffman Estates, and Vera L. Hill, Niles, all of Ill., assignors to Gas Research Institute, Chicago, Ill.

Filed Jun. 9, 1989, Ser. No. 364,701
Int. Cl.[5] B01J 21/06, 23/02, 23/28, 27/051
U.S. Cl. 502—220 16 Claims

1. A mixed-solid solution tri-metallic oxide/sulfide catalyst having the formula:

$$M_I O_a S_b . M_{II} O_c . M_{III} O_d$$

wherein

M_I is selected from the group consisting of vanadium, neodymium, tantalum, chromium, molybdenum, tungsten, and mixtures thereof;

O is oxygen;

S is sulfur;

a is selected from zero and a number up to a positive real number representing the stoichiometric requirement, and

b is selected from zero and a number up to a positive real number representing the stoichiometric requirement, provided one of a and b is a positive real number;

M_{II} is selected from the group consisting of titanium, zirconium, hafnium, and mixtures thereof;

c is a positive real number up to the stoichiometric requirement;

M_{III} is selected from the group consisting of lithium, sodium, potassium, rubidium, cesium, francium, beryllium, magnesium, calcium, strontium, barium, radium, zinc, cadmium, mercury, scandium, yttrium, lanthanum, actinium, and mixtures thereof; and

d is a positive real number up to the stoichiometric requirement; and

wherein $M_I O_a S_b$ is mixed in a solid solution of $M_{II} O_c$. $M_{III} O_d$.

4,929,586

CATALYSTS FOR SELECTIVE CATALYTIC REDUCTION DENOX TECHNOLOGY

Louis Hegedus, Rockville; Jean W. Beeckman; Wie-Hin Pan, both of Columbia, and Jeffrey P. Solar, Silver Spring, all of Md., assignors to W. R. Grace & Co.-Conn., New York, N.Y.

Filed Jun. 9, 1988, Ser. No. 204,641
Int. Cl.[5] B01J 21/00, 23/16, 27/02
U.S. Cl. 502—217 53 Claims

1. A catalyst for the selective removal of nitrogen oxides from exhaust and waste gases in the presence of ammonia comprising:

(a) a formed support of titania particles further containing other porous inorganic oxide particles, said formed support having

(i) a total porosity of up to 0.80 cc/cc which is made up of a micropore porosity (comprising pores having a pore diameter 600 Angstrom units or less) of 0.05 to 0.5 cc/cc and a macroporosity (comprising pores having diameters greater than 600 Angstrom units) of 0.05 to 0.5 cc/cc, and

(ii) said titania being substantially present in the anatase phase, and

(b) a metal oxide catalytic component deposited on said support selected from the group consisting of V_2O_5, MoO_3, WO_3, Fe_2O_3, $CuSO_4$, $VOSO_4$, SnO_2, Mn_2O_3, Mn_3O_4, and mixtures thereof, said metal oxide being present in an amount from a catalytically effective amount to 25% by weight of the entire catalyst.

2. A catalyst according to claim 1, wherein said other inorganic oxide is selected from the group consisting of SiO_2, Al_2O_3, ZrO_2, $AlPO_4$, Fe_2O_3, B_2O_3 and mixtures thereof.

6. A catalyst according to claim 1, further comprising barium sulfate in an amount of from 1–15% by weight of the formed support.

7. A catalyst according to claim 2, wherein the porous inorganic oxide is silica gel or precipitated silica.

4,929,587

METHOD FOR INTERCALATING ORGANIC-SWELLED LAYERED METAL CHALCOGENIDE WITH POLYMER CHALCOGENIDE BY TREATMENT WITH POLYMERIC CHALCOGENIDE PRECURSOR IN INERT ATMOSPHERE

Brent A. Aufdembrink, Wilmington, Del., and Michael E. Landis, Woodbury, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 140,529, Jan. 4, 1988, abandoned. This application Feb. 23, 1989, Ser. No. 314,611
Int. Cl.[5] B01J 21/06, 20/10
U.S. Cl. 502—242 20 Claims

1. A method for intercalating an organic-swelled layered metal chalcogenide with a polymeric chalcogenide which comprises:

(a) contacting said organic-swelled layered metal chalcogenide with a compound capable of conversion to said polymeric chalcogenide by hydrolysis, said contacting taking place in an inert atmosphere; and

(b) converting said compound in the presence of water to the polymeric chalcogenide.

6. The method of claim 1 wherein said polymeric chalcogenide is an polymeric oxide and said layered metal chalcogenide is a layered oxide.

8. The method of claim 6 wherein said polymeric oxide comprises polymeric silica.

9. The method of claim 1 wherein said layered metal chalcogenide is titanometallate-type layered metal oxide product comprising a layered metal oxide wherein each layer of the metal oxide has the general formula

$$[M_x[\ ]_y Z_{2-(x+y)} O_4]^{q-}$$

wherein M is at least one metal of valence n wherein n is an integer between 0 and 7 and preferably is 2 or 3, [ ] represents a vacancy site, Z is a tetravalent metal, preferably titanium, and wherein

$$q = 4y - x(n-4), \text{ and } 0 < x+y < 2$$

4,929,588

SODIUM REMOVAL, FROM BRINES

Teresita C. Frianeza-Kullberg, and Darrish W. Barnette, both of Gastonia, N.C., assignors to Lithium Corporation of America, Gastonia, N.C.

Division of Ser. No. 127,819, Dec. 2, 1987, Pat. No. 4,859,343. This application Jun. 8, 1989, Ser. No. 363,037
Int. Cl.[5] B01J 20/06, 20/08, 20/16
U.S. Cl. 502—402 3 Claims

3. A method of producing supported antimonic acid comprising:

(a) impregnating a particulate ion exchange supporte mate-

rial selected from anion exchange resins, alumina and silica-alumina with antimony (V) pentachloride;
(b) drying the impregnated particulate support material under an inert atmosphere;
(c) slowly adding, with agitation, ammonium hydroxide to the dried impregnated particulate support material to precipitate antimonic acid;
(d) adding water to the mixture and heating the mixture at the reflux temperature for about 24 hours;
(e) separating the particulate material from the liquid.

4,929,589

METAL OXIDE/HYDROXIDE PARTICLES COATED WITH PHOSPHATE ESTERS

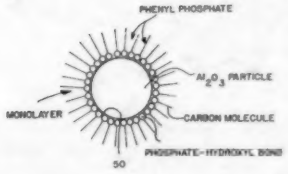
Edward S. Martin, New Kensington, and Larry F. Wieserman, Apollo, both of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Continuation of Ser. No. 23,312, Mar. 9, 1987, Pat. No. 4,871,411, which is a continuation-in-part of Ser. No. 946,870, Dec. 29, 1986, abandoned. This application Jun. 2, 1989, Ser. No. 360,979

The portion of the term of this patent subsequent to Oct. 3, 2006, has been disclaimed.

Int. Cl.[5] **B01J** *20/04, 20/32;* **B01D** *15/08;* **B32B** *9/00*

U.S. Cl. 502—406 **36 Claims**



20. An active material comprising metal oxide/hydroxide particles comprised of an oxide/hydroxide of a metal selected from the group consisting of titanium, zirconium, iron, chromium, zinc, vanadium, and combinations thereof having chemically bonded to substantially all of the reactive sites on a surface thereof, a monomolecular layer of a phosphoric acid ester having a phosphorus-containing group and a carbon-containing group, said phosphoric acid ester being selected from the class consisting of:
(a) phosphoric acid monoester having the formula $(RO)PO(OH)_2$; and
(b) phosphoric acid diester having the formula $(RO)(R'O)PO(OH)$; where R and R' are selected from the group consisting of long and short chain aliphatic hydrocarbons, aromatic hydrocarbons, carboxylic acids, aldehydes, ketones, amines, amides, thioamides, imides, lactams, anilines, pyridines, piperidines, carbohydrates, lactones, ethers, alkenes, alkynes, alcohols, nitriles, oximes, organosilicones, ureas, thioureas and combinations of these groups; said bond being formed by reaction of said phosphorus-containing group with said metal oxide/hydroxide surface, said carbon-containing group being oriented away from said metal oxide/hydroxide surface.

4,929,590

THERMOSENSITIVE RECORDING MATERIAL

Keiichi Maruta; Takashi Ueda, both of Numazu, and Yasuhiko Watanabe, Shizuoka, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Mar. 2, 1989, Ser. No. 317,979

Int. Cl.[5] **B41M** *5/18*

U.S. Cl. 503—207 **11 Claims**

1. A thermosensitive recording material comprising:
(a) a support,
(b) an undercoat layer formed on said support, which comprises spherical hollow particles made of a plastic material having a glass transition temperature ranging from 40° C. to 90° C., said spherical hollow particles having a mean particle diameter of 0.20 um to 1.5 μm, and a voidage of 40% to 90%, and a binder resin in an effective amount, and
(c) a thermosensitive coloring layer formed on said undercoat layer, which comprises as the main components a leuco dye and a color developer capable of inducing color formation in said leuco dye upon application of heat thereto.

4,929,591

IMAGE-RECEIVING SHEET

Noritaka Egashira; Kenichiro Suto, and Atsushi Muro, all of Shinjuku, Japan, assignors to Dai Nippon Insatsu Kabusi ki Kaisha, Japan

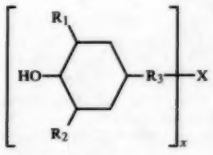
Filed Nov. 9, 1988, Ser. No. 268,987

Claims priority, application Japan, Nov. 13, 1987, 62-286574; Oct. 24, 1988, 63-266243

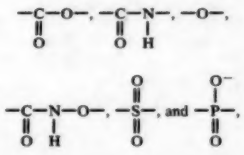
Int. Cl.[5] **B41M** *5/035, 5/26*

U.S. Cl. 503—227 **5 Claims**

1. An image-receiving sheet for thermal dye transfer, comprising a substrate sheet and a dye receiving layer formed on at least one surface of said substrate sheet, said dye receiving layer comprising a synthetic resin and at least one antioxidant represented by the following formula:



wherein
$R_1 = C_lH_{2l+1}$ ($l \geqq 0$),
$R_2 = C_mH_{2m+1}$ ($m \geqq 0$),
R_3 is a substituted or unsubstituted alkyl having at least one bond represented below in its main skeleton



X is a sulfur atom, carbon atom or null, and
x is an integer from 2 to 4.

4,929,592

HEAT TRANSFER SHEET

Jumpei Kanto, Komae, and Hiroshi Eguchi, Shinjuku, both of Japan, assignors to Dai Nippon Insatsu Kabushiki Kaisha, Japan

Filed Dec. 14, 1988, Ser. No. 284,403

Claims priority, application Japan, Dec. 17, 1987, 62-317576

Int. Cl.[5] **B41M** *5/035, 5/26*

U.S. Cl. 503—227 **5 Claims**

1. A heat transfer sheet comprising a base film and a sublimable dye layer containing a binder formed on the base film,

characterized in that an adhesive layer comprising an organic titanate is provided between said base film and said dye layer

and wherein the weight ratio of the dye to the binder (dye/binder ratio) both constituting said dye layer is 1.4 or more.

4,929,593

THERMAL TRANSFER RECORDING MATERIAL

Toshiaki Tezuka; Kunihiro Koshizuka, and Takao Abe, all of Hino, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Jul. 28, 1989, Ser. No. 386,784

Claims priority, application Japan, Aug. 2, 1988, 63-192981

Int. Cl.[5] B41M *5/26*

U.S. Cl. 503—227 **10 Claims**

1. A thermal transfer recording material, comprising

a thermal transfer recording medium comprising a support (A) having thereon a heat softening colorant layer and

a recording sheet comprising a support (B) having thereon an image-receiving layer,

in which one of said heat softening colorant layer and said image-receiving layer contains a curable polymer, and the other of them contains a curing agent capable of curing said curable polymer.

4,929,594

SUPERCONDUCTING COMPOSITION $TL_2BA_2CUO_{6+x}$ AND PROCESS FOR MANUFACTURE

Jagannatha Gopalakrishnan, Wilmington, and Munirpallam A. Subramanian, New Castle, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 14, 1988, Ser. No. 167,616

Int. Cl.[5] C01F *11/02;* **C01G** *3/02, 15/00;* **H01L** *39/12*

U.S. Cl. 505—1 **2 Claims**

1. Single phase crystalline metal oxide having the formula $Tl_2Ba_2CuO_{6+x}$ wherein x is from 0 to about 0.5.

4,929,595

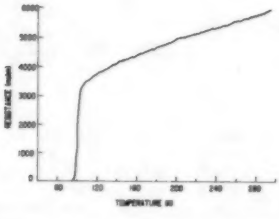
SUPERCONDUCTING THIN FILM FABRICATION

Maw-Kuen Wu, Huntsville, Ala., assignor to The University of Alabama at Huntsville, Huntsville, Ala.

Filed Feb. 26, 1988, Ser. No. 161,012

Int. Cl.[5] H01L *39/12, 39/24;* **C23C** *14/34*

U.S. Cl. 505—1 **3 Claims**



1. A superconducting cuprate oxide thin film on a substrate prepared by the steps of:

forming a target material by mixing together appropriate amounts of metal oxide in order to form a superconducting phase of a cuprate oxide;

annealing said target material in oxygen;

forming a substrate material by mixing together appropriate amounts of metal oxides to form at least one semiconducting phase of said superconducting cuprate oxide superconductor;

sputtering said target material to form a film on said substrate material; and

annealing said film and substrate in an oxygen environment.

4,929,596

PROCESS FOR PRODUCING A MULTIPLE-FILAMENT OXIDE SUPERCONDUCTOR

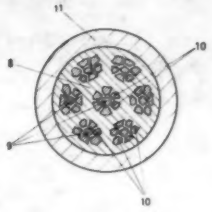
Gundolf Meyer, Birmenstorf; Erwin Schönfeld, Baden-Dättwil, and Clemens Verpoort, Fislisbach, all of Switzerland, assignors to Asea Brown Boveri AG, Baden, Switzerland

Filed Jul. 18, 1988, Ser. No. 220,251

Claims priority, application Switzerland, Jul. 24, 1987, 2818/87; Oct. 30, 1987, 4263/87; Jan. 14, 1988, 113/88

Int. Cl.[5] H01L *39/24;* **B22F** *7/00*

U.S. Cl. 505—1 **2 Claims**



1. A process for producing a multiple-filament oxide superconductor, wherein, at least one group of holes is arranged in a silver body provided with a nickel cladding which serves as a framework, in a manner such that around one central hole in each group there are arranged further holes, and wherein an oxygen-releasing substance whose oxygen saturation vapor pressure is between 10^{-3} bar and 2000 bar in a temperature range of 400° to 950° C. selected from the group consisting of BaO_2; a mixture of BaO_2 and BaO; MnO_2; a mixture of MnO_2 and Mn_2O_3; Pb_3O_4; and a mixture of Pb_3O_4 and PbO is poured into at least one of the central holes, and wherein a mixture of pulverulent starting substances consisting essentially of a rare earth metal oxide, a barium-oxygen compound selected from the group consisting of a BaO_2 and a mixture of BaO_2 and BaO and a copper oxide (CuO) in an approximately stoichiometric ratio to provide a desired superconductor or a preformed superconductor powder produced from the same starting substances is poured into the other holes, and wherein, the cross-section of the entire structure is successively reduced by at most 2% using grooved rolls and drawing and a multiple-filament oxide superconductor is formed by annealing the entire structure under a pressure of at least 10 bar at a temperature of 500° to 900° C. for at least 1 hr.

4,929,597

SUPERCONDUCTOR CONTAINING INTERNAL STRESS ABSORBER

Takuo Takeshita; Tadashi Sugihara, and Shuichi Fujino, all of Saitama, Japan, assignors to Mitsubishi Metal Corporation, Tokyo, Japan

Filed Mar. 27, 1989, Ser. No. 328,653

Claims priority, application Japan, Mar. 25, 1988, 63-71633

Int. Cl.[5] B32B *9/00*

U.S. Cl. 505—1 **8 Claims**

1. A superconductor containing a superconductive oxide and an internal stress absorbing substance distributed over the superconductive oxide, in which said internal stress absorbing substance ranges from about 0.12% by volume to about 7.9% by volume, and in which said internal stress absorbing sub-

stance is selected from the group consisting of a copper oxide and a barium oxide.

4,929,598

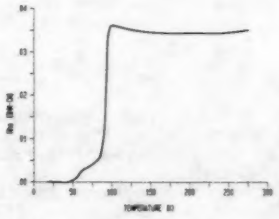
OXYGEN PLASMA TREATMENT OF YTTRIUM BARIUM COPPER OXIDE

Brian G. Bagley, Watchung Boro, and Jean-Marie Tarascon, Millington, both of N.J., assignors to Bell Communications Research, Inc., Livingston, N.J.

Division of Ser. No. 64,803, Jun. 19, 1987, abandoned. This application Dec. 30, 1988, Ser. No. 292,020

Int. Cl.[5] B05D *5/12, 3/06*

U.S. Cl. 505—1 **3 Claims**



1. Method for the preparation of a superconducting thin film composition of the formula $YBa_2Cu_3O_{(7-x)}$ wherein x has a value less than 0.75 which comprises subjecting a thin film of non-superconducting $YBa_2Cu_3O_{(7-x)}$ wherein x has a value greater than 0.75 to an oxygen plasma near room temperature for at least one hour.

4,929,599

PERFUMING INGREDIENT

Wolfgang K. Giersch, Bernex, and Karl-Heinrich Schulte-Elte, Onex, both of Switzerland, assignors to Firmenich SA, Geneva, Switzerland

Filed Apr. 12, 1989, Ser. No. 336,967

Claims priority, application Switzerland, Apr. 27, 1988, 1575/88

Int. Cl.[5] A61K *7/46*

U.S. Cl. 512—18 **12 Claims**

1. A method for enhancing, improving or modifying the odor properties of a perfuming composition or perfumed product, which method comprises adding to said composition or product a fragrance effective amount of 2-(2,3,4,5,6,7-hexahydro-1,1,4,4-tetramethyl-2(1H)-indenyl)-ethyl acetate.

4,929,600

ENDOCRINE MANIPULATION TO IMPROVE BODY COMPOSITION OF POULTRY

Larry A. Cogburn, New London, Pa., assignor to University of Deleware, Newark, Del.

Filed Mar. 18, 1988, Ser. No. 169,737

Int. Cl.[5] A61K *37/36, 35/55, 31/195*

U.S. Cl. 514—2 **16 Claims**

1. A method for lowering the extent of fat deposition in living poultry grown substantially for meat production and having normal or enhanced pituitary functions during the normal growth cycle of the poultry, which comprises:

(a) providing growth hormone so that the poultry have an enhanced blood level of growth hormone, and

(b) providing exogenous thyroid hormone to the living poultry during the finishing phase of the normal growth cycle of the poultry, said providing of the exogenous thyroid hormone being delayed until the poultry are at least about three weeks of age, said thyroid hormone, when compared to 3,3',5-triiodothyronine as a standard, having at least 30% of the thyroid activity and at least about 15% of the receptor-binding capability of 3,3',5-triiodo-L-thyronine.

4,929,601

TRIPEPTIDES USEFUL AS IMMUNOSTIMULANTS AS WELL AS IN THE PREVENTION OF METASTASES

Brunetto Brunetti, Milan, and Marco Prada, Cassalpusterlengo, both of Italy, assignors to Eliem Industria Farmaceutica, S.p.A., Milan, Italy

Filed Aug. 2, 1988, Ser. No. 227,356

Claims priority, application Italy, Aug. 4, 1987, 21575 A/87

Int. Cl.[5] A61K *37/02;* **C07K** *5/08*

U.S. Cl. 514—18 **11 Claims**

1. A method of treating a metastatic disorder comprising administering to a subject in need of treatment, a pharmaceutically effective amount of a tripeptide of the general formula

X-Gly-Y

where X is L-Arg or D-Arg and Y is L-Asp or D-Asp, or a pharmaceutically acceptable salt thereof.

4,929,602

METHOD OF INHIBITING PLATELET DEPENDENT ARTERIAL THROMBOSIS

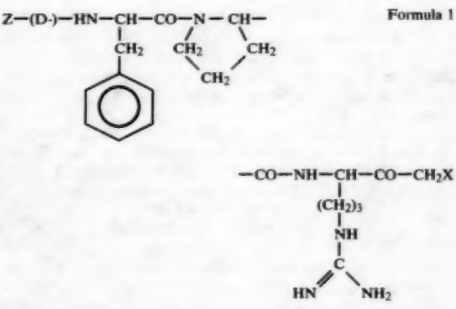
Laurence A. Harker, San Diego, and Stephen R. Hanson, Encinitas, both of Calif., assignors to Scripps Clinic and Research Foundation, La Jolla, Calif.

Continuation-in-part of Ser. No. 125,178, Nov. 25, 1987, abandoned. This application Nov. 22, 1988, Ser. No. 275,330

Int. Cl.[5] A61K *37/02;* **C07K** *5/08*

U.S. Cl. 514—18 **21 Claims**

1. A method of inhibiting platelet dependent arterial thrombosis in a patient which method comprises administering to said patient a therapeutically effective amount of peptide represented by Formula 1



Formula 1

wherein Z is hydrogen or a C_1–C_6 acyl; X is a halogen atom; and the hydrohalic acid addition products thereof.

4,929,603

USE OF PHYTOSTERYL GLYCOSIDES FOR THE TREATMENT OF EPOXYCHOLESTEROL LEVELS

Karl H. Pegel, Durban, South Africa, and Hans Walker, Eschwege, Fed. Rep. of Germany, assignors to Rooperal (NA) NV, Amsterd AM

Continuation of Ser. No. 918,940, Oct. 15, 1986, abandoned, which is a continuation-in-part of Ser. No. 690,607, Jan. 11, 1985, abandoned. This application Oct. 25, 1988, Ser. No. 262,130

Claims priority, application Fed. Rep. of Germany, Jan. 14, 1984, 3401178

Int. Cl.[5] A61K *31/70*

U.S. Cl. 514—26 **1 Claim**

1. The method of treatment of increased endogenous 5(6)α-

epoxycholesterol level in the prostate gland of a human comprising providing a daily administration of a dose as small as 0.45 mg of β-sitosterol glucoside.

4,929,604

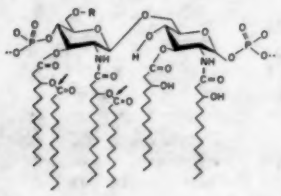
LIPOPOLYSACCHARIDES OF REDUCED TOXICITY AND THE PRODUCTION THEREOF

Robert S. Munford, and Catherine L. Hall, both of Dallas, Tex., assignors to Board of Regents, The University of Texas System, Austin, Tex.

Filed May 28, 1986, Ser. No. 868,428

Int. Cl.[5] A61K *31/715;* **C12P** *19/26;* **C12N** *9/16;* **C07H** *13/10*

U.S. Cl. 514—53 **14 Claims**



1. An altered Gram-negative bacterial lipopolysaccharide

(1) with 3-hydroxyfatty acids having at least 90% unesterified 3-hydroxy functions and

(2) having toxicity reduced to a greater extent than immunostimulatory activity when compared to the unaltered lipopolysaccharide shown in FIG. 1, wherein said 3-hydroxyfatty acids are covalently linked to glucosaminyl moieties of the lipopolysaccharide lipid A.;

4,929,605

PHARMACEUTICAL COMPOSITION FOR PIPERIDINOALKANOL DERIVATIVES

Jack Domet, and Dhiren N. Shah, both of Cincinnati, Ohio, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio

Continuation-in-part of Ser. No. 152,689, Feb. 5, 1988, abandoned, which is a continuation-in-part of Ser. No. 117,166, Nov. 4, 1987, abandoned, which is a continuation-in-part of Ser. No. 105,928, Oct. 7, 1987, abandoned. This application Mar. 17, 1989, Ser. No. 325,254

Int. Cl.[5] A61K *31/44, 9/20, 47/00*

U.S. Cl. 514—54 **20 Claims**

1. A pharmaceutical composition in solid unit dosage form comprising (a) a therapeutically effective amount of a piperidinoalkanol compound, or a pharmaceutically acceptable salt thereof, (b) pharmaceutically acceptable nonionic surfactant in an amount of from about 0.1% to about 6% by weight of the composition, and (c) pharmaceutically acceptable carbonate salt in an amount of from about 2% to about 50% by weight of the composition.

4,929,606

AZACYCLOALKYLALKANEDIPHOSPHONIC ACIDS USEFUL FOR TREATING DISEASES ATTRIBUTED TO CALCIUM METABOLISM DISORDERS

Knut A. Jaeggi, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

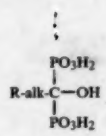
Filed Nov. 7, 1988, Ser. No. 267,585

Claims priority, application Switzerland, Nov. 13, 1987, 4435/87

Int. Cl.[5] C07F *9/65;* **A61K** *31/675*

U.S. Cl. 514—80 **7 Claims**

1. Azacycloalkylalkanediphosphonic acids of formula (I)



(I)

wherein R is a 3-azabicyclo[3.2.2]nonane radical which is unsubstituted by up to and including three C_1–C_4 alkyl groups and is attached by way of the aza ring member and alk is lower alkylene and pharmaceutically acceptable salts thereof.

7. A method of treating diseases in which an anomalous deposition of sparingly soluble calcium salts or an anomalous degeneration of hard body tissues is the principal symptom which comprises administering an effective amount of a compound according to claim 1 or a pharmaceutically acceptable salt thereof to a warm-blooded animal in need thereof.

4,929,607

OXAZAPHOSPHORIN-4-THIO ALKANESULPHONIC ACIDS, NEUTRAL SALTS THEREOF AND METHOD TO TREAT CANCER DISEASES AND TO PRODUCE IMMUNOSUPPRESSION

Gerhard Scheffler; Ulf Niemeyer; Norbert Brock, all of Bielefeld, and Jörg Pohl, Halle, all of Fed. Rep. of Germany, assignors to ASTA Pharma Aktiengesellshaft, Frankfurt

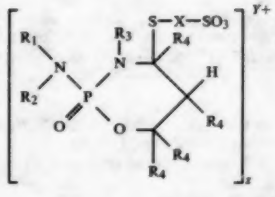
Continuation of Ser. No. 5,375, Jan. 12, 1987, abandoned, which is a continuation of Ser. No. 712,952, Mar. 15, 1985, abandoned, which is a continuation of Ser. No. 509,385, Jun. 30, 1983, abandoned, which is a division of Ser. No. 356,636, Mar. 10, 1982, abandoned. This application Feb. 2, 1988, Ser. No. 149,954

Claims priority, application Fed. Rep. of Germany, Mar. 24, 1981, 3111428

Int. Cl.[5] A61K *31/66*

U.S. Cl. 514—110 **13 Claims**

1. A method of treating in animals or humans a malignant condition susceptible to treatment and selected from the group consisting of leukemia, lymphoma, myeloma, neutroblastoma, retinoblastoma, mycosis fungoides, breast tumors, lung tumors, bronchial carcinoma, testicular carcinoma, Ewing sarcoma, Hodgkin's disease, and ovarial tumors which comprises administration to an animal or human in need thereof of a pharmcologically effective amount to treat the indicated malignant conditions of a compound according to Formula I:



I

in which R_1 and R_2 represent 2-chloroethyl; R_3 and R_4 represent hydrogen; X represents a straight or branched chain C_{2-6} alkylene group which may have a mercapto group at the carbon atom in the 1, 2, 3, 4 or 5 position of the alkylene chain, and Y^+ represents a hydrogen cation, an alkali metal or alkaline earth metal cation, a quanidinium, morpholinium or cyclohexylammonium cation or a cation which is derived from an amine of the formula $NR_5R_6R_7$, in which the radicals R_5 to R_7 are the same or different and represent hydrogen, a C_1–C_2 alkyl group or an oxyethyl group, or Y^+ represents an ethylene diammonium cation (H_3H^+—CH_2CH_2—NH_3) or a piperazonium cation, and z represents 1 when Y^+ represents a mono-basic cation, or z represents 2 when Y^+ represents a dibasic cation, or the cation of the compound having two mono-basic cations.

4,929,608

EMULSIFIABLE CONCENTRATES OF MALATHION

Tario Mahmood, Flanders, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed May 2, 1985, Ser. No. 729,723
Int. Cl.[5] A01N 57/00
U.S. Cl. 514—122 8 Claims

1. Emulsifiable concentrate compositions comprising, on a weight basis: 10.0% to 55.0% [S-1,2-bis-(ethoxycarbonyl) ethyl] 0,0-dimethyl phosphorodithioate (malathion); 8.0% to 15.0% the ethoxylated nonionic surfactant blend having a boiling point of 300° F., a specific gravity of 0.971, a percent volatiles by volume of 8.0% and identified by the Infrared Spectrum indicated in FIG. I; and a vegetable oil to total said composition to 100.0%.

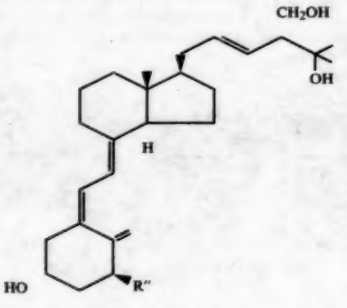
4,929,609

25, 28-DIHYDROXYERGOCALCIFEROL AND 1,25,28-TRIHYDROXYERGOCALCIFEROL COMPOSITIONS THEREOF AND THEIR USE IN THE TREATMENT OF HYPERPROLIFERATIVE DISEASE

Andrew D. Batcho, North Caldwell, N.J.; Ronald L. Horst, Huxley, Iowa, and Milan R. Uskokovic, Upper Montclair, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J. and The United States of America as represented by the Department of Agriculture, Washington, D.C.

Continuation of Ser. No. 24,944, Mar. 12, 1987, abandoned. This application Nov. 14, 1988, Ser. No. 272,170
Int. Cl.[5] A61K 31/59; C07J 9/00
U.S. Cl. 514—167 17 Claims

1. A compound of the formula



I

wherein R'' is hydrogen or hydroxy, an epimer at the 24-position of a compound of formula I, or a diastereomeric mixture of compounds of formula I which are epimeric at the 24-position.

4,929,610

COMPOSITION WHICH CONTAIN HYDROXYLATED DERIVATIVES OF VITAMIN D_3

Werner Meier, Bottmingen, Switzerland; Walter A. Rambeck, Munich, Fed. Rep. of Germany; Harald Weiser, Hochwald, Switzerland, and Hermann Zucker, Munich, Fed. Rep. of Germany, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation of Ser. No. 880,620, Jun. 25, 1986, abandoned. This application Jul. 21, 1989, Ser. No. 384,865
Claims priority, application Switzerland, Jul. 1, 1985, 2798/85; Apr. 24, 1986, 1663/86
Int. Cl.[5] A01N 45/00; A61K 31/59
U.S. Cl. 514—167 23 Claims

1. A pharmaceutical composition wherein a pharmaceutical carrier is combined with a mixture of hydroxylated derivatives of vitamin D which mixtures are selected from the group consisting of the following mixtures: 1α,25-dihydroxy-vitamin D_3 and 1α,24,25-trihydroxy-vitamin D_3; 1α,25-dihydroxy-vitamin D_3 and 1α,25,26-trihydroxy-vitamin D_3; 1α,25-dihydroxy-vitamin D_3 and 25,26-dihydroxy-vitamin D_3; 1α,25-dihydroxy-vitamin D_3, 24,25-dihydroxy-vitamin D_3, and 1α,24,25-trihydroxy-vitamin D_3; 1α,25-dihydroxy-vitamin D_3, 25,26-dihydroxy-vitamin D_3, and 1α,25,26-trihydroxy-vitamin D_3; 1α-hydroxy-vitamin D_3; and 1α,24,25-trihydroxy-vitamin D_3; and 1α-hydroxy-vitamin D_3 and 1α,25,26-trihydroxy-vitamin D_3; and a pharmaceutical carrier material.

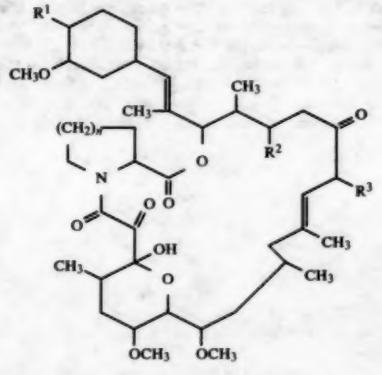
4,929,611

METHOD FOR IMMUNOSUPPRESSION

Masakuni Okuhara; Hirokazu Tanaka; Toshio Goto, all of Ibaraki; Tohru Kino, Tsuchiura, and Hiroshi Hatanaka, Ibaraki, all of Japan, assignors to Fujisawa Pharmaceutical Company, Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 799,855, Nov. 24, 1985, Pat. No. 4,894,366. This application May 30, 1986, Ser. No. 868,749
Claims priority, application United Kingdom, Dec. 3, 1984, 8430455; Feb. 5, 1985, 8502869; Apr. 1, 1985, 8508420
Int. Cl.[5] A61K 31/395
U.S. Cl. 514—183 5 Claims

1. A method for treating resistance to transplantation which comprises administering an effective amount of a compound of the formula:



wherein

R^1 is hydroxy or pharmaceutically acceptable protected hydroxy selected from 1-(lower alkylthio)(lower)alkyloxy, tri(lower)alkylsilyloxy, lower alkyl-diphenylsilyloxy, pharmaceutically acceptable organic carboxylic acyloxy, pharmaceutically acceptable organic sulfonic acyloxy, and pharmaceutically acceptable organic carbamic acyloxy,

R^2 is hydrogen, hydroxy or lower alkanoyloxy,

R^3 is methyl, ethyl, propyl or allyl,

n is an integer of 1 or 2, and

the symbol of a line and dotted line is a single bond or a double bond,

or pharmaceutically acceptable basic salt thereof to a subject in need of said treatment.

4,929,612

THIADIAZOLYLACETAMIDE CEPHEM DERIVATIVES

Yoshimasa Machida; Shigeto Negi; Takashi Kamiya; Yuuki Komatu; Isao Sugiyama; Yasunobu Kai, all of Ibaraki; Takaharu Nakamura, Chiba; Toshihiko Naito, Ibaraki; Kyosuke Kitoh, Ibaraki; Kanemasa Katsu, Ibaraki, and Hiroshi Yamauchi, Ibaraki, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

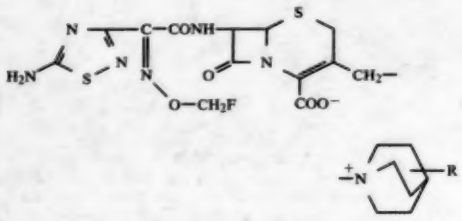
Filed Apr. 14, 1988, Ser. No. 181,427

Claims priority, application Japan, Apr. 17, 1987, 62-93234

Int. Cl.[5] **C07D** *501/46;* **A61K** *31/545*

U.S. Cl. 514—202 **5 Claims**

1. A thiadiazolylacetamide cephem compound of the formula:



or a pharmaceutically acceptable salt thereof, wherein R is carbamoyl or hydroxy lower alkyl.

4,929,613

ANTIBACTERIAL AGENTS

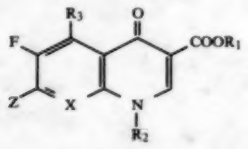
Townley P. Culbertson, Ann Arbor; John M. Domagala, Canton; Susan E. Hagen, Canton Township, Wayne County, and Joseph P. Sanchez, Canton, all of Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

Continuation-in-part of Ser. No. 89,382, Aug. 26, 1987, abandoned. This application Jul. 25, 1988, Ser. No. 222,608

Int. Cl.[5] **C07D** *401/04, 215/22;* **A61K** *31/47, 31/435*

U.S. Cl. 514—210 **28 Claims**

1. A compound of the formula



I

or a pharmaceutically acceptable acid addition salt thereof wherein:

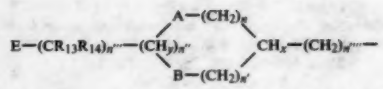
R_1 is hydrogen, alkyl of from one to six carbon atoms, or a cation selected from sodium, potassium, magnesium and calcium;

R_2 is alkyl of from one to six carbon atoms, cycloalkyl of from three to six carbon atoms, vinyl, 4-fluorophenyl, 2,4-difluorophenyl, 2-aminopyridyl, 3-aminopyridyl or 4-aminopyridyl;

R_3 is hydrogen, halogen, OR_4, wherein R_4 is hydrogen or alkyl of from one to three carbon atoms, NHR_5 wherein R_5 is hydrogen or lower alkyl of from one to three carbon atoms, CF_3, or COOH;

X is CH, CF, CBr, CCl, CNO_2, CNH_2, CCF_3, or COR_6 wherein R_6 is hydrogen or alkyl of from one to three carbon atoms;

Z is



II

wherein one endocyclic double bond may be present between any two consecutive ring positions or two alternating or nonalternating endocyclic double bonds may be present in the ring;

wherein

n, n', n''', and n'''' are each independently 0, 1, or 2;

n'' is 0, 1, 2, or 3;

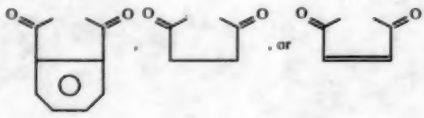
y is 0 or 1;

x is 0 or 1;

A and B are each independently CH, CH_2, NR_7 wherein R_7 is hydrogen or R_7 is R_8CO wherein R_8 is alkyl of from one to ten carbon atoms, wherein alkyl may be substituted by hydroxy, halogen, COOH, or $CONHR_9$ wherein R_9 is hydrogen or alkyl of from one to four carbon atoms and when B is NR_7, A can be absent; with the proviso that Z is a carbocycle or a four to six member ring with one nitrogen;

R_{13} and R_{14} are each independently hydrogen or lower alkyl of from one to three carbon atoms; and

E is hydrogen, alkyl of from one to three carbon atoms, OR_{10} wherein R_{10} is hydrogen or alkyl of from one to three carbon atoms, $NR_{11}R_{12}$ wherein R_{11} and R_{12} are each independently hydrogen, lower alkyl of from one to three carbon atoms, cycloalkyl of from three to six carbon atoms, alkanoyl with a carbon chain of from one to three atoms, or R_{11} and R_{12} when taken together with the nitrogen to which they are attached form a ring of from three to six carbon atoms or



with the proviso that E must be $NR_{11}R_{12}$ when both A and B are C or CH_2.

4,929,614

BENZODIAZEPINES, PROCESS AND INTERMEDIATES FOR THE PREPARATION THEREOF AND THEIR APPLICATION IN THERAPY

Alain P. Calvet, L'Hay-les-Roses; Jean-Louis Junien, Sevres; Ives R. Pascal, Rueil Malmaison; Xavier B. Pascaud, Paris, and Francois J. Roman, Courbevoie, all of France, assignors to Jouveinal S.A., Paris, France

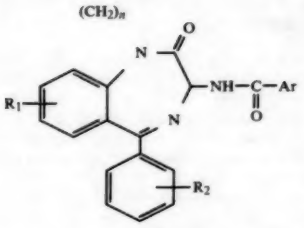
Filed Apr. 14, 1989, Ser. No. 337,940

Claims priority, application France, Apr. 25, 1988, 88 05443

Int. Cl.[5] **A61K** *31/55;* **C07D** *487/04, 471/04*

U.S. Cl. 514—214 **10 Claims**

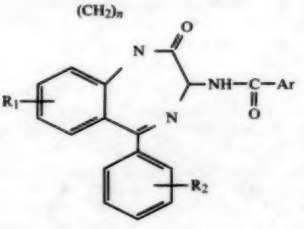
1. Benzodiazepines of formula



(I)

in which R_1 is H or halogen, R_2 is H or halogen, Ar is indolyl, phenyl, naphthyl, indolyl monosubstituted with a halogen or with a methoxy or phenyl mono-, di- or trisubstituted with a halogen or with a methoxy or with a trifluoromethyl group, and n is 2 or 3; and their optical isomers.

8. A medicinal product for combatting gastrointestinal disorders; disorders of the pancreas, gall bladder and appetite; pain; and disorders of the central nervous system, said composition comprising in a pharmaceutically acceptable vehicle in an amount effective to combat said disorders and pain a benzodiazepine having the formula.



(I)

wherein

R_1 is hydrogen or halogen,

R_2 is hydrogen or halogen,

Ar is indolyl, phenyl, naphthyl, indolyl monosubstituted with halogen or methoxy, or phenyl mono-, di- or trisubstituted with halogen, methoxy or trifluoromethyl, and

n is 2 or 3;

and the optical isomers thereof.

4,929,615

7H-BENZO[B]PYRAZINO[1,2-D]PYRROLO[3,2,1-JK][1,4]BENZODIAZEPINES

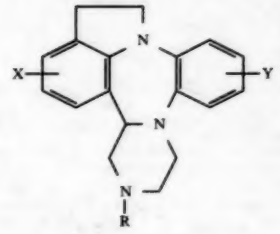
Edward J. Glamkowski, Warren, and Barbara E. Kurys, Elmwood Park, both of N.J., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.

Filed Jun. 12, 1989, Ser. No. 364,395

Int. Cl.[5] C07D *487/06*; A61K *31/55*

U.S. Cl. 514—219 **8 Claims**

1. A compound of the formula



wherein R is hydrogen, loweralkyl, or a group of the formula $COO(CR^1Z)_mCR^2R^3R^4$ wherein R^1, R^2, R^3 and R^4 are hydrogen or loweralkyl, Z is hydrogen, loweralkyl, or halogen, and m is 0 or 1; X and Y are independently hydrogen, halogen, loweralkyl, or trifluoromethyl; the dotted line represents an optional carbon-to-carbon bond; an optical isomer thereof, or a pharmaceutically acceptable acid addition salt thereof.

7. A method of treating depression comprising administering to a mammal in need of depression treatment a depression treating effective amount of a compound according to claim 1.

4,929,616

NOVEL BASIC-SUBSTITUTED 5-HALO-THIENOISOTHIAZOL-3(2H)-ONE 1,1-DIOXIDES, A PROCESS FOR THE PREPARATION THEREOF, AND PHARMACEUTICAL PREPARATIONS CONTAINING THESE COMPOUNDS

Dieter Binder, Wien, and Franz Rovensky, Bruck an der Leitha, both of Austria, assignors to Chemisch Pharmazeutische Forschungsgesellschaft, Linz, Austria

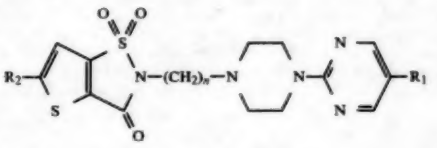
Filed Feb. 6, 1989, Ser. No. 306,744

Claims priority, application Austria, Feb. 18, 1988, 390/88

Int. Cl.[5] A61K *31/505*; C07D *521/00*

U.S. Cl. 514—253 **4 Claims**

4. A method for the treatment of anxiety states in humans which comprises administering to a patient an anxiolytically effective amount of a compound of the formula



I

defined in claim 1 or a pharmaceutically acceptable salt thereof, in combination with a pharmaceutically acceptable excipient, carrier or diluent.

4,929,617

2-TERT-BUTYL-5-ISOXAZOLYLMETHYLTHIO-3(2H)-PYRIDAZIN-3-ONE

Joachim Leyendecker, Mannheim; Rainer Buerstinghaus, Telgte; Hans Theobald, Limburgerhof; Christoph Kuenast, Otterstadt, and Peter Hofmeister, Neustadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

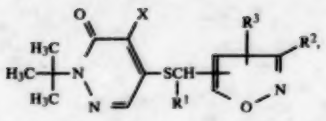
Filed Dec. 12, 1988, Ser. No. 283,128

Claims priority, application Fed. Rep. of Germany, Dec. 12, 1987, 3742266

Int. Cl.[5] A31K *31/50*; C07D *231/04*

U.S. Cl. 514—252 **5 Claims**

1. A 2-tert-butyl-5-isoxazolylmethylthio-3(2H)-pyridazin-3-one compound of the formula I



(I)

where R^1 is hydrogen or C_1–C_4-alkyl, R^2 is hydrogen, C_1–C_8-alkyl, C_2–C_8-alkenyl, C_1–C_4-haloalkyl, C_2–C_8-alkoxyalkyl, C_3–C_{10}-cycloalkyl, C_2–C_5-alkoxycarbonyl, phenyl, C_7–C_{10}-phenylalkyl, phenyl which is mono-, di- or trisubstituted by halogen, C_1–C_8-alkyl, C_1–C_8-alkoxy, C_1–C_4-haloalkyl, C_1–C_4-haloalkoxy, phenyl, phenoxy or cyano, and/or mono- or disubstituted by nitro, or is C_7–C_{10}-phenylalkyl substituted in the phenyl moiety, R^3 is hydrogen, halogen, C_1–C_8-alkyl or C_2–C_8-alkenyl, and X is chlorine or bromine.

4,929,618

PIPERDINE AND PIPERAZINE DERIVATIVES, AND ANTIHISTAMINIC PHARMACEUTICAL COMPOSITIONS CONTAINING THE SAME

Akihide Koda, Gifu; Jun'ichiro Kita, Ube; Yoshiaki Kuroki, Ube; Hiroshi Fujiwara, Ube; Shinji Takamura, Ube, and Kayoko Yamano, Ube, all of Japan, assignors to Ube Industries, Ltd., Ube, Japan

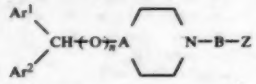
Filed Mar. 16, 1989, Ser. No. 325,306

Claims priority, application Japan, Mar. 25, 1988, 63-69711; Jul. 15, 1988, 63-175142

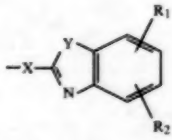
Int. Cl.[5] **A61K** *31/495, 31/445;* **C07D** *417/14, 401/14*

U.S. Cl. 514—253 **49 Claims**

1. A compound represented by Formula (I):



wherein Ar^1 and Ar^2 each independently represent a group selected from the group consisting of a phenyl group; phenyl groups having a halogen atom, a nitro group, a lower alkoxy group, a lower alkyl group or a lower alkyl group substituted with halogen atoms; and a pyridyl group; n is an integer of 0 or 1; A is a group selected from the group consisting of >N— and >CH—, with the proviso that when A is >N—, n is 0, and when A is >CH—, n is 1; B represents an alkylene group or an alkenylene which may be a straight chain having 2 to 6 carbon atoms or a branched chain having at least 2 carbon atoms in the main chain; Z is represented by Formula (II):



(wherein X and Y each independently represent a group selected from the group consisting of >NH, —O— and —S—, R_1 and R_2 each independently represent a group selected from the group consisting of a hydrogen atom, halogen atoms, a lower alkyl group and a lower alkoxy group) or a group of Formula (II'):

(wherein Z' represents a group selected from the group consisting of a lower alkyl group, hydroxyl group, a lower alkoxy group, a phenoxy group, an amino group, a lower alkylamino group, an anilino group, a phenyl group and phenyl groups substituted with a lower alkyl group, with the proviso that when Z' is a phenyl group or a phenyl group substituted with a lower alkyl group, at least either one of said Ar^1 and Ar^2 is a pyridyl group, and, when Z is represented by Formula (II'), A is >CH and n is 1), or its pharmaceutically acceptable acid adduct.

15. An antihistaminic and antiallergic pharmaceutical composition which comprises the compound or its pharmaceutically acceptable acid adduct as described in claim 1 as an active component.

4,929,619

ANTI-INFECTIVE METHODS AND COMPOSITIONS

Steven T. Blackman, New York, N.Y., assignor to Thames Pharmacal Co., Inc., Ronkonkoma, TIONS 5 03121990 36 05291990 ZZX None 7 1 1 Henley, III; Raymond J. Robinson; Douglas W. 0 0

Continuation of Ser. No. 218,956, Jul. 14, 1988, Pat. No. 4,873,265. This application Aug. 7, 1989, Ser. No. 389,962

Int. Cl.[5] **A61K** *31/52, 31/045*

U.S. Cl. 514—263 **7 Claims**

1. A method of providing local bactericidal or bacteriostatic treatment to a human or animal tissue area in need thereof comprising applying to said tissue area an effective amount of a composition containing (a) about 2.0% by weight of diphenhydramine or a pharmaceutically acceptable salt thereof; (b) about 60% by weight of ethyl alcohol; and (c) a pharmaceutically acceptable topical vehicle.

4,929,620

5-PYRIMIDINYL-3,5-DIHYDROXY-6-HEPTENOIC ACID COMPOUNDS USEFUL AS INHIBITORS OF CHOLESTEROL BIOSYNTHESIS

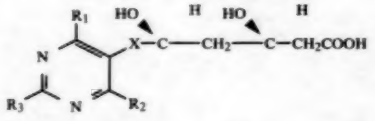
Alexander W. Chucholowski, Ypsilanti; Bruce D. Roth, Ann Arbor, and Drago R. Sliskovic, Ypsilanti, all of Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 130,870, Dec. 10, 1987, Pat. No. 4,868,185. This application Jun. 1, 1989, Ser. No. 361,155

Int. Cl.[5] **C07D** *405/06*

U.S. Cl. 514—269 **8 Claims**

1. A compound of the formula:



wherein X is $—CH_2CH_2—$ or —CH=CH—;
wherein R_1 and R_2 are independently selected from
hydrogen;
alkyl of from one to six carbons;
alkoxy of from one to four carbon atoms;
trifluoromethyl;
cyclopropyl;
cyclohexyl;
cyclohexylmethyl;
phenyl;
phenyl substituted with
fluorine,
chlorine,
bromine,
hydroxy,
trifluoromethyl,
alkyl of from one to four carbon atoms, or
alkoxy of from one to four carbon atoms;
phenylmethyl; or
phenylmethyl substituted with
fluorine,

chlorine,
bromine,
hydroxy,
trifluoromethyl,
alkyl of from one to four carbon atoms, or
alkoxy of from one to four carbon atoms;
wherein R_3 is
hydrogen;
alkyl of from one to six carbon atoms;
trifluoromethyl;
cyclopropyl;
phenyl; or
phenyl substituted with
fluorine,
chlorine,
bromine,
hydroxy,
trifluoromethyl,
alkyl of from one to four carbon atoms, or
alkoxy of from one to four carbon atoms;
or a pharmaceutically acceptable salt thereof.

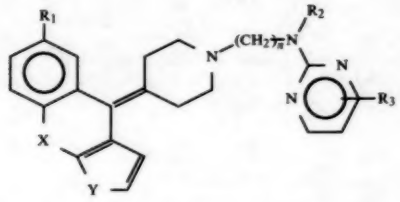
4,929,621

1-1[(2-PYRIMIDINYL)AMINO-ALKYL]PIPERIDINES, THEIR PREPARATION AND THEIR APPLICATION IN THERAPY

Philippe Manoury, Verrieres le Buisson, and Alfred Saarmets, Sucy en Brie, both of France, assignors to Synthelabo, Paris, France

Division of Ser. No. 242,430, Sep. 8, 1988, Pat. No. 4,891,376. This application Aug. 29, 1989, Ser. No. 399,983
Claims priority, application France, Sep. 20, 1987, 8712502
Int. Cl.[5] A61K *31/505;* **C07D** *401/06, 405/14*
U.S. Cl. 514—275 **1 Claim**

1. A method for the treatment of anxiety or depression which comprises administering to a subject suffering therefrom or biable to suffer therefrom an effective amount of a compound of formula:



in which:
X is a $(CH_2)_2$, CH=CH or CH_2—CO group;
Y is a CH=CH group or sulphur;
n is 2, 3 or 4;
R_1 is hydrogen or a halogen;
R_2 is hydrogen or a (C_{1-4}) alkyl group; and
R_3 is hydrogen or a hydroxy group;
or a pharmaceutically acceptable acid addition salt thereof.

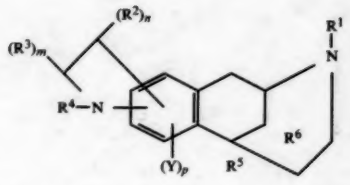
4,929,622

2,6-METHANOPYRROLO-3-BENZAZOCINES

Richard C. Allen, Flemington, and David G. Wettlaufer, Phillipsburg, both of N.J., assignors to Hoechst-Roussel Pharmaceuticals, Inc., Somerville, N.J.

Continuation-in-part of Ser. No. 101,716, Sep. 24, 1987, abandoned. This application Nov. 16, 1988, Ser. No. 272,045
Int. Cl.[5] C07D *471/08;* **A61K** *31/435*
U.S. Cl. 514—281 **62 Claims**

1. A compound of the formula



wherein R^1 is selected from the group consisting of hydrogen, loweralkyl, loweralkenyl, cycloalkylloweralkyl, arylloweralkyl, arylaminoloweralkyl, cyano, and —C(O)R^9 wherein R^9 is hydrogen, loweralkyl or loweralkoxy; R^2 and R^3 are independently selected from the group consisting of loweralkyl, arylloweralkyl, halogen, oxo, and —C(O)R^7 wherein R^7 is selected from the group consisting of hydrogen, loweralkyl, aryl, arylloweralkyl, hydroxy, loweralkoxy, arylloweralkoxy, aryloxy and amino; R^4 is selected from the group consisting of hydrogen, loweralkyl, arylloweralkyl, and —C(O)R^8 wherein R^8 is selected from the group consisting of hydrogen, loweralkyl, arylloweralkyl, aryl, loweralkoxy, arylloweralkoxy and aryloxy; R^5 and R^6 are independently hydrogen or loweralkyl, or taken together are a bivalent radical of the formula $—(CH_2)_4$; m, n, and p are integers independently having values of zero or 1, with the proviso that the sum of m and n only exceeds 1 when at least one of R^2 and R^3 is linear loweralkyl, hydrogen, or oxo; Y is halogen or loweralkyl; and the dotted line in said compound is an optional bond; with the additional proviso that the pyrrole group is fused on adjacent carbons of the benzene ring, not bridging the ring; the term "aryl" in each case designating a phenyl group optionally substituted by up to 3 substituents each of which is independently loweralkyl, loweralkoxy, halogen, trifluoromethyl, nitro or cyano; and the geometrical isomers, optical antipodes; or pharmaceutically acceptable acid addition salts thereof.

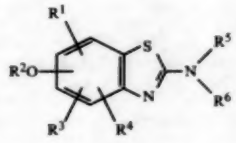
4,929,623

BENZOTHIAZOLE DERIVATIVE

Shinya Abe, Ushiku; Mitsuaki Miyamoto; Masayuki Tanaka, both of Tsukuba; Kozo Akasaka, Ushiku; Kenji Hayashi, Tsukuba; Tetsuya Kawahara, Tsukuba; Satoshi Katayama, Tsukuba; Yoshinori Sakuma, Ushiku; Takeshi Suzuki, Ushiku, and Isao Yamatsu, Ushiku, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

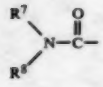
Filed Jun. 16, 1988, Ser. No. 207,329
Claims priority, application Japan, Jun. 17, 1987, 62-150987
Int. Cl.[5] C07D *277/82;* **A61K** *31/425*
U.S. Cl. 514—293 **27 Claims**

1. A benzothiazole compound having the formula:



wherein R^1, R^3, and R^4 may be the same or different and are each a hydrogen atom, a lower alkyl group, a halogen atom, an acyl group, a hydroxyl group, a lower alkoxy group, a hydroxy lower alkyl group, a nitro group, an amino group, or a lower dialkylamino group, provided that any two of R^1, R^3 and R^4 may be combined together to form an aromatic ring which may consist of only carbon atoms or additionally contain a nitrogen atom,

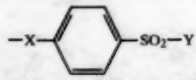
R^2 is a hydrogen atom, an acyl group, a group represented by the formula:



wherein R^7 and R^8 may be the same or different and are each a hydrogen atom or a lower alkyl group,

R^5 is a hydrogen atom, and

R^6 is a group represented by the formula:



wherein X is a —CO— or a —CH_2—, and Y is a lower alkyl group or a group represented by the formula:

wherein R^9 and R^{10} may be the same or different and are each a hydrogen atom, a lower alkyl group, a halogen atom, a lower alkoxy group, a hydroxy lower alkyl group or a lower dialkyl group or a pharmaceutically acceptable salt thereof.

4,929,624

OLEFINIC 1H-IMIDAZO(4,5-C)QUINOLIN-4-AMINES

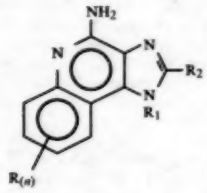
John F. Gerster, and Roy T. Knafla, both of Woodbury, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Mar. 23, 1989, Ser. No. 327,693

Int. Cl.[5] C07D 471/02

U.S. Cl. 514—293 **7 Claims**

1. A compound of the formula:



wherein R_1 is selected from the group consisting of straight chain or branched chain alkenyl containing 2 to about 10 carbon atoms and substituted straight chain or branched chain alkenyl containing 2 to about 10 carbon atoms, wherein the substituent is selected from the group consisting of straight chain or branched chain alkyl containing 1 to about 4 carbon atoms; cycloalkyl containing 3 to about 6 carbon atoms; and cycloalkyl containing 3 to about 6 carbon atoms substituted by straight chain or branched chain alkyl containing 1 to about 4 carbon atoms; and

R_2 is selected from the group consisting of hydrogen, straight chain or branched chain alkyl containing one to about eight carbon atoms, benzyl, (phenyl)ethyl and phenyl, the benzyl, (phenyl)ethyl or phenyl substituent being optionally substituted on the benzene ring by one or two moieties independently selected from the group consisting of straight chain or branched chain alkyl containing one to about four carbon atoms, straight chain or branched chain alkoxy containing one to about four carbon atoms, and halogen, with the proviso that when the benzene ring is substituted by two such moieties, then the moieties together contain no more than 6 carbon atoms; and

each R is independently selected from the group consisting of straight chain or branched chain alkoxy containing one to about four carbon atoms, halogen, and straight chain or branched chain alkyl containing one to about four carbon atoms, and n is an integer from zero to 2, with the proviso that if n is 2, then said R groups together contain no more than 6 carbon atoms; or a pharmaceutically acceptable acid addition salt thereof.

4,929,625

ETHERS

Ian A. Cliffe, Cippenham, England, assignor to John Wyeth and Brothers Limited, Maidenhead, England

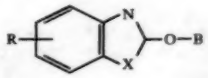
Filed Aug. 1, 1988, Ser. No. 226,657

Claims priority, application United Kingdom, Aug. 4, 1987, 8718444; May 20, 1988, 8811975

Int. Cl.[5] A61K 31/435

U.S. Cl. 514—304 **11 Claims**

1. A compound of the formula



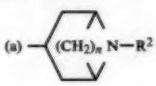
IA

wherein

X is O or S;

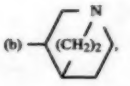
R is hydrogen, C_{1-4}alkyl, C_{1-4}alkoxy, amino, mono-C_{1-4}alkylamino, di(C_{1-4}-alkyl)amino, fluorine, chlorine, trifluoromethyl, phenyl, mono-chloro- or fluorophenyl, C_{1-4}alkylphenyl, mono-C_{1-4}-alkoxyphenyl, carboxy, carboxamido, nitro, thiol, C_{1-4}-alkylthio, and C_{1-4}-alkoxycarbonyl; and

B is

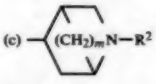


(II)

where n is 2,3 or 4 and R^2 is hydrogen, C_{1-4}alkyl, C_{1-4}alkoxy, allyl, methallyl, cycopentyl, cyclohexyl, cyclopentylmethyl, cyclohexylmethyl or benzyl,

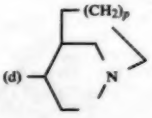


(III)



(IV)

where R^2 has the meaning given above and m is 1, 2 or 3



(V)

where p is 0, 1 or 2,

or a N-oxide of the 2-benzoxazolyl or 2-benzothiazolyl nitrogen thereof, or a pharmaceutically acceptable acid addition salt of a compound of formula IA or of said N-oxide thereof.

4,929,626

α-SUBSTITUTED 4-(QUINOLIN-2-YL-METHOXY)PHENYLACETIC ACIDS AND ESTERS AND LIPOXYGENASE INHIBITION THEREWITH

Klaus Mohrs, Wuppertal; Siegfried Raddatz; Romanis Fruchtmann, both of Cologne; Christian Kohlsdorfer, Erfstadt, and Reiner Müller-Peddinghaus, Bergisch-Gladbach, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

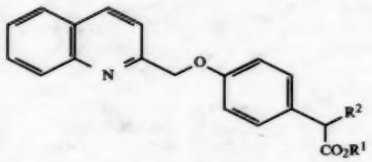
Filed Apr. 12, 1989, Ser. No. 336,974

Claims priority, application Fed. Rep. of Germany, Apr. 29, 1988, 3814504

Int. Cl.[5] C07D *215/14;* A61K *31/47*

U.S. Cl. 514—311 **11 Claims**

1. An α-substituted 4-(quinolin-2-yl-methoxy)phenylacetic acid or ester thereof of the formula



(I)

in which

R^1 - stands for hydrogen, alkyl, arylalkyl, aryl or

- for a group of the formula

$$—CH_2—CO_2—R^3,$$

where

R^3 - stands for hydrogen, alkyl, arylalkyl or aryl and

R^2 - stands for hydrogen, alkyl, alkenyl or alkinyl, or a pharmaceutically acceptable salt thereof.

10. A method of inhibiting lipoxygenase in a patient in need thereof which comprises administering to such patient an amount effective therefor of a compound or salt according to claim 1.

4,929,627

BENZO-FUSED CYCLOALKANE AND OXA- AND THIA-, CYCLOALKANE TRANS-1,2-DIAMINE DERIVATIVES

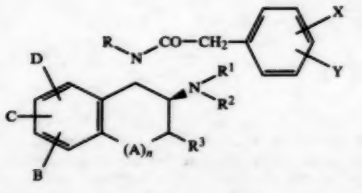
Penio Penney, Chadds Ford, Pa.; Parthasarathi Rajagopalan, and Richard M. Scribner, both of Wilmington, Del., assignors to E. I. Du Pont De Nemours and Company, Wilmington, Del.

Division of Ser. No. 71,028, Jul. 16, 1987, which is a continuation-in-part of Ser. No. 905,543, Sep. 10, 1986, abandoned. This application Jun. 7, 1989, Ser. No. 362,681

Int. Cl.[5] C07D *407/04, 409/04;* A61K *31/40*

U.S. Cl. 514—320 **30 Claims**

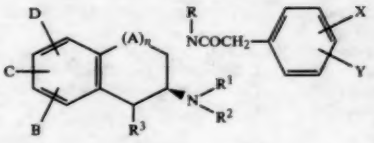
1. A compound having the formula:



(I)

or

-continued



(II)

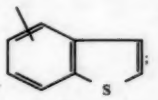
wherein for the enantiomers and racemic mixtures

n is 1;

A is —O—, or —S—;

B, C and D independently are selected from the group consisting of H, OH, $OCOR_5$, $OCH_2CH_2OR_5$, OR_6, R_6, CH_2OR_6, CH_2COR_7, Cl, F, Br, I, NH_2, NHR_8, NR_8R_9, SH, SR_6, CH_2SR_6 and $OC(S)N(CH_3)_2$;

X and Y independently are selected from the group consisting of H, OCH_3, Cl, F, Br, I, NO_2, CF_3, CN, SO_2R^{10}, and SO_2CF_3 or;



X and Y taken together with the benzene ring form

R and R^1 independently are selected from the group consisting of H, and alkyl of 1 to 3 carbon atoms;

R^2 and H; alkyl of 1 to 6 carbon atoms; CH_2CF_3; alkenylmethyl of 3 to 6 carbon atoms; hydroxyalkylmethyl of 2 to 5 carbon atoms; cycloalkyl of 3 to 6 carbon atoms; cyclopropylmethyl; cyclobutylmethyl, or phenylalkyl of 7 to 9 carbon atoms; or R2 can be taken together with R^1 and the nitrogen to which they are attached to be 1-azetidinyl; 1-pyrrolidinyl 1-piperazinyl optionally substituted at the 4-position by alkyl of 1 to 3 carbon atoms; 1-morpholino;

R^3 is H;

R^5 is alkyl of 1 to 6 carbon atoms, phenyl, or mono-substituted phenyl;

R^6, R^8, R^9, R^{10} and R^{13} are independently an alkyl group of 1 to 3 carbon atoms; and

R^7 is selected from the group consisting of H, OH, OR^{13}, NHR^{13}, and NR_2^{13}; or

a stable N-oxide or a pharmaceutically acceptable salt thereof.

4,929,628

OXADIAZOLE COMPOUNDS, THEIR PREPARATION AND THEIR USE AS PESTICIDES

Alastair McArthur; Royston H. Davis; Mark D. Hilton; Trevor W. Newton, and Dinesh M. Patel, all of Sittingbourne, England, assignors to Shell Internationale Research Maatschappij, B. V., The Hague, Netherlands

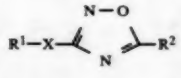
Filed Jan. 19, 1989, Ser. No. 298,691

Claims priority, application United Kingdom, Jan. 21, 1988, 8801289

Int. Cl.[5] C07D *271/06;* A01N *43/26*

U.S. Cl. 514—364 **9 Claims**

1. A 1,2,4-oxadiazole compound of the general formula



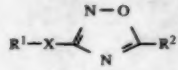
(I)

wherein

R^1 is a group selected from phenyl and phenyl substituted by one to three substituents independently selected from halogen atoms, C_{1-6} alkoxy groups and C_{1-6} hydroxyimino alkyl groups,

R^2 is a group selected from phenyl and phenyl substituted by one to three substituents independently selected from halogen atoms, C_{1-6} alkoxy groups and nitro groups, and X is oxygen.

2. A pesticidal composition exhibiting acaricidal activity comprising a carrier and, as an active ingredient, an acaricidally effective amount of a 1,2,4-oxadiazole compound of the general formula



(I)

wherein

R^1 is a group selected from phenyl and phenyl substituted by one to three substituents independently selected from halogen atoms, C_{1-6} alkoxy groups and C_{1-6} hydroxyimino alkyl groups,

R^2 is a group selected from phenyl and phenyl substituted by one to three substituents independently selected from halogen atoms, C_{1-6} alkoxy groups and nitro groups, and X is oxygen or sulfur.

4,929,629

THERAPEUTIC COMPOUND

James E. Jeffery, and Derek Whybrow, both of Nottingham, England, assignors to Boots Company, PLC, Nottingham, England

Continuation of Ser. No. 938,395, Dec. 5, 1986, abandoned. This application Apr. 19, 1989, Ser. No. 342,638

Claims priority, application United Kingdom, Dec. 17, 1985, 8531071

Int. Cl.[5] A61K *31/135*

U.S. Cl. 514—646 **3 Claims**

1. An N,N-dimethyl-1-[1-(4-chlorophenyl)cyclobutyl]-3-methylbutylamine hydrochloride monohydrate product in crystalline solid form essentially comprising equimolar amounts of N,N-dimethyl-1-[1-(4-chlorophenyl)cyclobutyl]-3-methylbutylamine hydrochloride and molecularly combined water of hydration, said product exhibiting substantially non-hydroscopic properties when exposed to atmospheric moisture environmental conditions.

4,929,630

TRANSGLUTAMINASE INHIBITORS

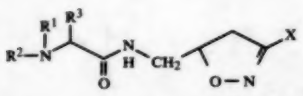
Arlindo L. Castelhano, Mississauga, Canada; Lawrence M. DeYoung, Half Moon Bay, Calif.; Alexander Krantz, Toronto, Canada; Diana H. Pliura, Mississauga, Canada, and Michael C. Venuti, San Francisco, Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Division of Ser. No. 25,451, Mar. 13, 1987, Pat. No. 4,912,120, which is a continuation-in-part of Ser. No. 839,743, Mar. 14, 1986, abandoned. This application Sep. 8, 1989, Ser. No. 404,791

Int. Cl.[5] A61K *31/44, 31/445, 31/42;* C07D *261/04*

U.S. Cl. 514—380 **13 Claims**

1. A method for treating mammals which have a disease stated characterized by elevated transglutaminsase activity comprising administering to the mammals a therapeutically effective amount of a compound of the formula;



(I)

or an optical isomer thereof, or a pharmaceutically acceptable salt thereof, wherein:

R^1 and R^2, together with the nitrogen atom to which they are attached, represent phthalimido; or R^1 and R^3 together form $—CH_2—CH_2—CH_2—$ or $CH_2—CHOH—CH_2$; or R^1, R^2 and R^3 are defined as follows:

R^1 is hydrogen or methyl;

R^2 is selected from the group consisting of:

(1) hydrogen;

(2) alkyl;

(3) lower alkyl sulfonyl;

(4) aryl sulfonyl;

(5) aryl sulfonyl substituted with lower alkyl on the aryl moiety;

(6) 9-fluorenylmethyloxycarbonyl, succinyl or cinnamoyl;

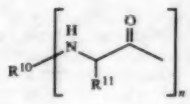
(7) a radical of the formula:

(II)

wherein:

R^9 is hydrogen; alkyl of 1 to 4 carbon atoms; aryl; aryl substituted with up to 2 substituents where the substituents are independently halo, lower alkyl, alkoxy, nitro, trifluoromethyl, carboxyl, or alkoxycarbonyl; aralkyl; pyridinyl; furanyl; alkoxy; aralkoxy; aralkoxy substituted on the aryl radical with up to 2 substituents where the substituents are independently halo, lower alkyl, alkoxy, nitro, or trifluoromethyl; adamantyloxy; aralkylamino; or aralkyl substituted on the aryl radical with up to 2 substituents where the substituents are independently hydroxy, alkoxy or halo; and

(8) a radical of the formula:



(III)

wherein:

n=0 or 1;

R^{10} is independently hydrogen, alkyl or the radical defined by formula (II) above;

R^{11} is selected from the group consisting of: hydrogen; lower alkyl; $—(CHR^{12})_mWR^{13}$ wherein m is 1 or 2, W is oxygen or sulfur and R^{12} and R^{13} are independently hydrogen or methyl; $—CH(CH_3)—OCH_2C_6H_5$;

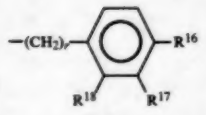
$—(CH_2)_kC(O)Y$ wherein k is 1 or 2 and Y is hydroxy, amino, alkoxy, or aralkoxy;

$—(CH_2)_pNHCH(NHR^{14})NR^{15}$ wherein p is 2,3, or 4 and R^{14} and R^{15} are independently hydrogen or lower alkyl;

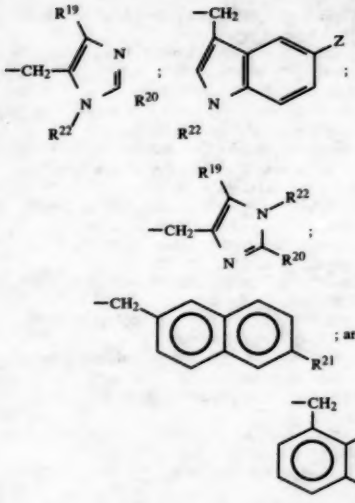
$—(CH_2)_qNH_2$ wherein q is 2, 3, 4, or 5;

$—(CH_2)_4NHCOOC(CH_3)_3$;

$—(CH_2)_2CHOHCH_2NH_2$; a radical of formula:



wherein r is 1 or 2 and R^{16}, R^{17} and R^{18} are independently hydrogen, hydroxy, halo, methoxy, lower alkyl, halo lower alkyl, amino, N-protected amino, guanidino, nitro cyano, —COOH, $—CONH_2$, $—COOR'''$ where R''' is lower alkyl, or $—OR^*$ where R^* is an O-protecting group; and a radical chosen from

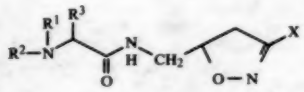


wherein R^{19} and R^{20} are independently hydrogen, lower alkyl, halo or trifluoromethyl alkyl; R^{21} is hydrogen, hydroxy or methoxy; and Z is hydrogen, hydroxy, or —OR* where R* is an O-protecting group; R^{22} is hydrogen or an N-protecting group for imidazole or indole functionalities;

R^3 is independently selected from the group recited for R^{11} above; and

X is selected from the group consisting of: halo; —OR, —SR, —S(O)R, —$S(O_2)$R, —$S(O)_2NH_2$ or —$S(O)_2$NHR wherein R is lower alkyl, mono-, di- or tri-fluoro alkyl of 2 or 3 carbon atoms, aryl, or optionally substituted aryl; —NR'R'' wherein R' and R'' are independently hydrogen, lower alkyl, or aryl; and

5. A method for treating mammals which have a disease state characterized by elevated transglutaminase activity comprising administering to the mammal a thereapeutically effective amount of a compound of the formula:



(I)

or an optical isomer thereof, or a pharmaceutically acceptable salt thereof, wherein:

R^1 and R^2, together with the nitrogen atom to which they are attached, represent phthalimido; or R^1, R^2 and R^3 are defined as follows:

R^1 is hydrogen;

R^2 is selected from the group consisting of:

aryl sulfonyl substituted with lower alkyl on the aryl moiety;

9-fluorenylmethyloxycarbonyl;

succinyl;

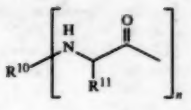
cinnamoyl; and

a radical of the formula:

(II)

wherein:

R^9 is hydrogen, alkyl of 1 to 4 carbon atoms; aryl with up to 2 substituents where the substituents are independently halo, lower alkyl or alkoxy; aralkyl; aralkoxy; aralkoxy substituted on the aryl radical with up to 2 substituents where the substituents are independently halo, lower alkyl, or lower alkoxy; adamantyloxy; and a radical of the formula:



(III)

wherein:

n=0 or 1;

R^{10} is independently hydrogen, alkyl or the radical defined by formula (II) above;

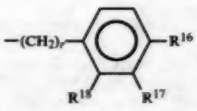
R^{11} is selected from the group consisting of:

hydrogen; lower alkyl; —$(CHR^{12})_mWR^{13}$ wherein m is 1 or 2, W is oxygen or sulfur and R^{12} and R^{13} are independently hydrogen or methyl;

—$(CH_2)_kC(O)Y$ wherein k is 1 or 2 and Y is hydroxy or amino, —$(CH_2)_pNHCH(NHR^{14})NR^{15}$ wherein p is 2,3, or 4 and R^{14} and R^{15} are independently hydrogen;

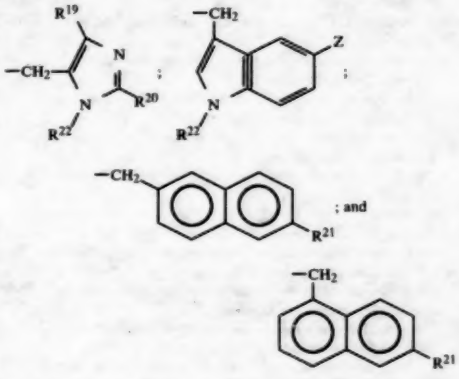
—$(CH_2)_qNH_2$ wherein q is 2, 3, 4, or 5;

a radical of formula:



wherein:

r is 1 and R^{16}, R^{17} and R^{18} are independently hydrogen, hydroxy, halo, methoxy, or amino, and a radical chosen from:



wherein:

R^{19} and R^{20} are independently hydrogen, R^{21} is hydrogen, hydroxy or methoxy; and Z is hydrogen, hydroxy, or —OR* where R* is an O-protecting group;

R^{22} is hydrogen or an N-protecting group for imidazole or indole functionalities;

R^3 is independently selected from the group recited for R^{11} above; and

X is selected from the group consisting of chloro and bromo.

6. A method for treating a hyman having a disease state characterized by elevated transglutaminase activity comprising administering to the human a therapeutically effective amount of a compound, or an optical isomer thereof, selected from the group consisting of: 5-(N-benzyloxycarbonyl-L-phenylalaninamidomethyl)-3-chloro-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-phenylalaninamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-para-tyrosinamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-ortho-tyrosinamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-D-naphthylalaninamidomethyl)-3-chloro-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-D-para-chlorophenylalaninamidomethyl)-3-chloro-4,5-dihydroisoxazole;

5-(N-tert-butoxycarbonyl-L-phenylalaninamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-aspartic acid-α-amidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-N-ε-tert-butoxycarbonyl-L-lysine-amidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-β-benzyl-L-aspartic acid amidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-glutamic acid amidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-β-benzyl-L-aspartic acid amidomethyl)-3-chloro-4,5-dihydroisoxazole;

5-(N-acetyl-L-naphthylalaninamidomethyl)-3-bromo-4,5-diihydroisoxazole;

5-(N-benzyloxycarbonyl-glycinamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-isoleucinamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-(9-fluorenylmethyloxycarbonyl)-L-phenylalaninamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-tert-butoxycarbonyl-O-benzyl-L-threoninamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-threoninamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-phenylalaninyl-L-alaninamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-alanyl-L-phenylalaninamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzoyl-L-phenylalaninamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-D-phenylalaninamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-naphthylmethylglycinamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-γ-glutamine amidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-phthaloyl-L-phenylalaninamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-D,L-meta-tyrosinamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-para-tyrosinamidomethyl)-3-chloro-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-para-tyrosinamidomethyl)-5-(S)-3-chloro-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-ortho-tyrosinamidomethyl)-3-cloro-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-meta-tyrosinamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-meta-tyrosinamidomethyl)-3-chloro-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-2-methoxyphenylalaninamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-4-methoxyphenylalaninamidomethyl)-3-chloro-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-3-methoxyphenylalaninamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-3-methoxyphenylalaninamidomethyl)-3-chloro-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-3,4-dihydroxy-phenylalaninamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-3,4-dihydroxy-phenylalaninamidomethyl)-3-chloro-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-3-methoxy-tyrosinamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-3-methoxy-tyrosinamidomethyl)-3-chloro-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-tryptophanamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-tryptophanamidomethyl-3-chloro-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-5-hydroxytryptophanamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-5-hydroxytryptophanamidomethyl)-3-chloro-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-histidinamidomethyl-3-bromo-4,5-dihydroisoxazole;

5-(N-im-benzoyl-N-α-benzyloxycarbonyl-L-histidinamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-toluenesulfonyl glycinamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzylcarbamoyl-L-phenylalaninamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-4-(R)-hydroxyl-L-prolinamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-para-methoxy-L-phenyl-alaninamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N^{α}, O-dibenzyloxycarbonyl-L-5-hydroxytryptophanamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-tryptophanamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N,O,O-tribenzyloxycarbonyl-(±)-3,4-dihydroxy-phenylalaninamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-(±)-3,4-dihydroxy-phenylalaninamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-(±)-para-fluoro-phenylalaninamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-tert-butoxycarbonyl-L-phenylalanyl-L-tyrosinamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N^{α},N-dibenzyloxycarbonyl-L-4-amino-phenylalaninamidomethyl)-3-bromo-4,5-diihydroisoxazole;

5-(N^{α}-benzyloxycarbonyl-N^{in}-formyl-L-tryptophanamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-para-amino-phenylalaninamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(L-phenylalanyl-L-tyrosinamidomethyl)-3-bromo-4,5-dihydroisoxazole-para-toluene-sulfonic acid;

5-(N-benzyloxycarbonyl-S-benzyl-L-cysteinamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-L-methioninamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-O-acetyl-L-tyrosinamidomethyl)-5-(S)-3-bromo-4,5-dihydroisoxazole;

5-(N,O-dibenzyloxycarbonyl-3-methoxy-L-tyrosinamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-benzyloxycarbonyl-(±)-para-iodophenylalaninamidomethyl)-3-bromo-4,5-dihydroisoxazole;

5-(N-2-(S)-(6methoxy-2-naphthyl)-propionyl-L-tyrosinamidomethyl)-5-(S)-3-bromo-4,5-dihydroisoxazole;

5-(N-α-benzyloxycarbonyl-L-glutamic acid α-amidomethyl)-3-chloro-4,5-dihydroisoxazole;

5-(N-para-methoxybenzyloxycarbonyl-L-tyrosinamidomethyl)-5-(S)-3-chloro-4,5-dihydroisoxazole;

5-(N-(2-(S)-(6-methoxy-2-naphthyl)-propionyl)-L-tyrosinamidomethyl) 5-(S)-3-chloro-4,5-dihydroisoxazole;

5-(N-(2-naphthyl-acetyl)-L-tyrosinamidomethyl-5-(S)-3-chloro-4,5-dihydroisoxazole;

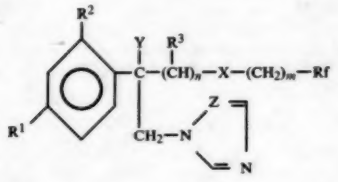
5-(N-(1-naphthyl-acetyl)-L-tyrosinamidomethyl)-5-(S)-3-chloro-4,5-dihydroisoxazole;
5-(N-isobutyloxycarbonyl-L-phenylalaninamidomethyl)-3-bromo-4,5-dihydroisoxazole;
5-(N-succinyl-L-phenylalaninamidomethyl)-3-bromo-4,5-dihydroisoxazole;
5-(N-benzyloxycarbonyl-L-threonyl-L-phenylalaninamidomethyl)-3-bromo-4,5-dihydroisoxazole;
5-(N-cinnamoyl-L-phyenylalaninamidomethyl)3-bromo-4,5-dihydroisoxazole;
5-(N-(2(S)-6-methoxy-2-naphthylpropionyl)-L-phenylalaninamidomethyl)-3-bromo-4,5-dihydroisoxazole;
5-(N-(2(S)-6-methoxy-2-naphthylpropionyl)-L-phenylalaninamidomethyl)5-(R)-3-bromo-4,5-dihydroisoxazole;
5-(N-(2-(S)-6-methoxy-2-naphthylpropionyl)-L-phenylalaninamidomethyl)-5-(S)-3-bromo-4,5-dihydroisoxazole;
5-(N-adamantyloxycarbonyl-L-phenylalaninamidomethyl)-3-bromo-4,5-dihydroisoxazole;
5-(N-2-chlorobenzyloxycarbonyl-L-phenylalaninamidomethyl)-3-bromo-4,5-dihydroisoxazole;
5-(N-(4-methoxybenzyloxycarbonyl)-L-phenylalaninamidomethyl)-3-bromo-4,5-dihydroisoxazole;
5-(N-(4-methoxybenzyloxycarbonyl)-L-phenylalaminamidomethyl)-5-(R)-3-bromo-4,5-dihydroisoxazole;
5-(N-(4-methoxybenzyloxycarbonyl)-L-phenylalaninamidomethyl)-5-(S)-3-bromo-4,5-dihydroisoxazole;
5-(N-tertbutoxycarbonyl-glycyl-L-phenylalaninamidomethyl)-3-bromo-4,5-dihydroisoxazole;
5-(N-α-benzyloxycarbonyl-L-lysinamidomethyl)-3-bromo-4,5-dihydroisoxazole oxalic acid;
5-(glycyl-L-phenylalaninamidomethyl)-3-bromo-4,5--hydroisoxazole oxalate salt;
5-(N-(6-methoxy-2-naphthyl)acetyl-L-phenylalaninamidomethyl)-3-chloro-4,5-dihydrosoxazole; and
5-(N-(6-methoxy-2-naphthyl)acetyl)-L-tyrosinamidomethyl)3-chloro-4,5-diydroisoxazole; or an optical isomer thereof.

4,929,631
FUNGICIDE AZOLYL-DERIVATIVES

Roberto Colle, Basiglio; Giovanni Camaggi, Novara; Franco Gozzo, San Donato Milanese; Giuseppina Ratti, Seregno; Carlo Garavaglia, Cuggiono, and Luigi Mirenna, Milan, all of Italy, assignors to Agrimont S.r.l., Milan, Italy

Filed Dec. 16, 1987, Ser. No. 133,602
Claims priority, application Italy, Dec. 23, 1986, 22828 A/86
Int. Cl.[5] A01N *43/653;* C07D *249/08*
U.S. Cl. 514—383 **5 Claims**

1. The compounds having the formula:



(I)

wherein:

R^1 is selected from the group consisting of F, Cl, Br, CF_3, a phenyl, a C_1–C_2 alkoxy, and a C_1–C_2 haloalkoxy, radical, in which the halogen is F, Cl, or Br;

R^2 is selected from the group consisting of H, F, Cl, Br, and CF_3;

R^3 is H, a C_1–C_4 alkyl or a C_3–C_6 cycloalkyl radical;

Y is OH;

n is 1, 2, 3, 4 with the proviso that Y can only be OH when n is 1;

m is 0 or 1;

X is O or S;

R_f is selected from the group consisting of C_1–C_5 polyfluoroalkyl and C_2–C_4 polyfluoroalkenyl radicals, each of these containing at least two fluorine atoms and

Z is N.

4,929,632
MEDICAMENTS

Michael B. Tyers, Welwyn; Jan H. Coates, Hertford; David C. Humber, London; George B. Ewan, Gerrards Cross, and James A. Bell, Royston, all of England, assignors to Glaxo Group Limited, London, England

Division of Ser. No. 877,805, Jun. 24, 1986, Pat. No. 4,753,789. This application Apr. 4, 1988, Ser. No. 177,042
Claims priority, application United Kingdom, Jun. 25, 1985, 8516083
Int. Cl.[5] A61K *31/415;* C07D *403/06*
U.S. Cl. 514—397 **9 Claims**

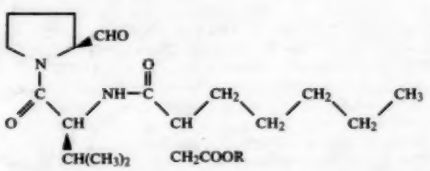
1. A method of treatment for the promotion of gastric emptying in a human or animal subject which comprises administering to the human or animal subject in need thereof an effective amount for the promotion of gastric emptying of 1,2,3,9-tetrahydro-9-methyl-3-[(2-methyl-1H-imidazol-1-yl)methyl]-4H-carbazol-4-one or a physiologically acceptable salt or solvate thereof.

4,929,633
ACTINONIN DERIVATIVES HAVING PHYSIOLOGICAL ACTIVITIES

Seiji Shibahara, Machida; Yukiko Takahashi, Kawasaki; Yuji Matsuhashi, Yokohama; Mitsugu Hachisu, Yokohama; Shinichi Kondo, Yokohama; Tomio Takeuchi, Shinagawa, and Takaaki Aoyagi, Fujisawa, all of Japan, assignors to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai and Meiji Seika Kaisha, Ltd., Tokyo, Japan

Filed Jun. 8, 1988, Ser. No. 203,888
Claims priority, application Japan, Jun. 11, 1987, 62-144176
Int. Cl.[5] C07C *207/08;* A61K *31/40*
U.S. Cl. 514—423 **6 Claims**

1. An actinonin derivative represented by the general formula (I):



(I)

wherein R means a hydrogen atom or a lower alkali group.

6. A method of treating an amnesia in an amnestic human patient, which comprises administering an actinonin derivative of the formula (I) as defined in claim 1, to the patient in an amount sufficient to reduce or eliminate a sympton of the amnesia.

4,929,634

METHOD OF AND BAIT COMPOSITIONS FOR CONTROLLING MOLLUSKS

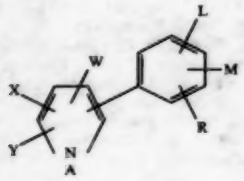
Rod A. Herman, Monmouth County, and Christine F. Kukel, Somerset County, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 112,904, Oct. 23, 1987, abandoned. This application Jul. 11, 1988, Ser. No. 216,097

Int. Cl.[5] A01N *43/36*

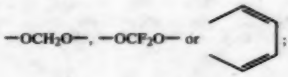
U.S. Cl. 514—426 **14 Claims**

1. A method for controlling mollusks comprising externally contacting said mollusks or internally administering to said mollusks a molluscicidally effective amount of an arylpyrrole compound having the structure:



(I)

wherein X is F, Cl, Br, I, or CF_3; Y is F, Cl, Br, I, CF_3 or CN; W is CN or NO_2; A is H; C_1–C_4 alkyl optionally substituted with from one to three halogen atoms, one hydroxy, one C_1–C_4 alkoxy, one C_1–C_4 alkylthio, one phenyl optionally substituted with C_1–C_3 alkyl, C_1–C_3 alkoxy or from one to three halogen atoms, one phenoxy optionally substituted with one to three halogen atoms or one benzyloxy optionally substituted with one halogen substituent; C_1–C_4 carbalkoxymethyl; C_3–C_4 alkenyl optionally substituted with from one to three halogen atoms; cyano; C_3–C_4 alkynyl optionally substituted with one halogen atom; di-(C_1–C_4 alkyl) aminocarbonyl; or C_4–C_6 cycloalkylaminocarbonyl; L is H, F, Cl or Br; and M and R are each independently H, C_1–C_3 alkyl, C_1–C_3 alkoxy, C_1–C_3 alkylthio, C_1–C_3 alkylsulfinyl, C_1–C_3 alkylsulfonyl, cyano, F, Cl, Br, I, nitro, CF_3, R_1CF_2Z, R_2CO or NR_3R_4, and when M and R are on adjacent positions and taken with the carbon atoms to which they are attached they may form a ring i.n which MR represents the structure:



Z is S(O)n or O; R_1 is H, F, CHF_2, CHFCl, or CF_3; R_2 is C_1–C_3 alkyl, C_1–C_3 alkoxy, or NR_3R_4; R_3 is H or C_1–C_3 alkyl; R_4 is H, C_1–C_3 alkyl, or R_5CO; R_5 is H or C_1–C_3 alkyl; and n is an integer of 0, 1 or 2.

4,929,635

NEW DERIVATIVES OF 4-VINYL BENZOIC ACID, PROCESS FOR THEIR PREPARATION AND THEIR USES IN THERAPEUTICS AND AS LIGANDS

Claude Coquelet, St Gely-du-Fesc; Samia Roussillon, Gignac; Daniel Sinchotle, St-Clement-la-Riviere; Claude Bonne, Bry-sur-Marne, and Alain Alazet, Agde, all of France, assignors to Laboratoires Chauvin-Blache, Montpellier, France

PCT No. PCT/FR85/00074, § 371 Date Dec. 5, 1985, § 102(e) Date Dec. 5, 1985, PCT Pub. No. WO85/04652, PCT Pub. Date Oct. 24, 1985

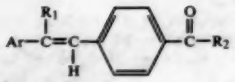
PCT Filed Apr. 3, 1985, Ser. No. 817,839

Claims priority, application France, Apr. 6, 1984, 84 05531

Int. Cl.[5] A61K *31/38;* **C07D** *333/22*

U.S. Cl. 514—438 **14 Claims**

1. Compounds of the formula



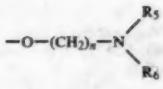
in which:

R_1 represents a methyl group;

Ar represents phenyl, 4-(C_{1-4} alkyl) phenyl, thienyl and C_{1-4} alkyl thienyl;

R_2 represents a hydroxy group; an amino group of the formula

in which R_3 and R_4 represent, independently from one another, a hydrogen atom, a C_1–C_6 alkyl group or amino (C_1–C_6) alkyl or R_3 and R_4 form, with the nitrogen atom to which they are attached, a 5–8 membered heterocyclic group saturated or not and which can contain another heteroatom selected from nitrogen, oxygen and sulfur; C_1–C_4 alkoxy group; a group of the formula —O— Ar, Ar having the above-given meaning; and aminoalkoxy group of the formula



in which R_5 and R_6 represent, independently from one another a C_1–C_4 alkyl group and n=1 to 4; and their pharmaceutically acceptable salts.

4,929,636

POSITIVE INOTROPHIC BENZOTHIAZOLE AND BENZOTHIOPHENE COMPOSITIONS AND METHOD OF USE THEREFOR

James Redpath, Bishopbriggs; Robert T. Logan, Lanark; David B. McFadzen, Hamiltom, and Robert G. Roy, Larkhall, all of Scotland, assignors to Akzo N.V., Arnhem, Netherlands

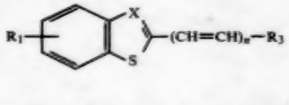
Continuation of Ser. No. 140,953, Dec. 28, 1987, abandoned, which is a continuation of Ser. No. 466, Jan. 5, 1987, abandoned, which is a division of Ser. No. 709,396, Mar. 7, 1985, Pat. No. 4,665,206. This application Apr. 6, 1989, Ser. No. 333,806

Claims priority, application United Kingdom, Mar. 16, 1984, 8406906

Int. Cl.[5] A61K *31/425, 31/38, 31/36*

U.S. Cl. 514—443 **17 Claims**

1. A pharmaceutical composition providing a positive inotropic effect to a subject which comprises an inotropically effective amount of a compound of the formula



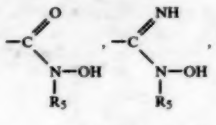
wherein

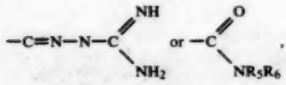
each R_1 is independently alkyl (1–6 C), alkoxy (1–6 C), hydroxy, halogen, NO_2, CF_3 or the group —NR_5R_6, or two adjacent substituents taken together may form a single methylene dioxy group,

m is from 1 to 4,

X represents nitrogen or the group

n has the value 0, 1 or 2, R_3 represents one of the moieties:





the latter meaning of R_3 (amide) only under the condition that for X is nitrogen the meaning of R_1 is limited to substituents selected from hydroxy, alkoxy (1–6 C) and methylene dioxy, and R_4, R_5 and R_6 represent hydrogen or alkyl (1–6 C) and pharmaceutically acceptable salts thereof in admixture with a pharamaceutically acceptable carrier therefor.

4,929,637

SUBSTITUTED THIOPHENE-2-SULFONAMIDE ANTIGLAUCOMA AGENTS

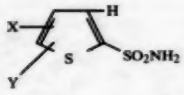
John J. Baldwin, Gwynedd Valley; Gerald S. Ponticello, and Charles N. Habecker, both of Lansdale, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 231,650, Aug. 10, 1988, abandoned, which is a continuation of Ser. No. 80,714, Jul. 31, 1987, abandoned, which is a continuation of Ser. No. 813,318, Dec. 24, 1985, abandoned. This application Dec. 14, 1988, Ser. No. 285,336

Int. Cl.[5] A61K *31/38*

U.S. Cl. 514—445 **5 Claims**

1. A method of treating elevated intraocular pressure which comprises the administration to a patient in need of such treatment of an effective intraocular pressure-lowering amount of a compound of structural formula:



wherein:

X is

(1) R wherein R is C_{1-5}alkyl, either straight or branched chain and either unsubstituted or substituted with one or more of:

(i) —OH

(ii)

wherein R^1 and R^2 are independently hydrogen, C_{1-5}alkyl or C_{2-5}alkanoyl,

(iii) phenyl or naphthyl, either unsubstituted or substituted with one or more of —OH, or C_{1-3}alkyl, or

(iv) a 6-membered nitrogen-containing heteroaryl selected from pyridyl, pyrazinyl or pyrimidinyl; or

(2)

wherein n is 0, 1 or 2;

Y

(1) C_{1-5}alkyl, either straight chain, branched chain or cyclic, and substituted with

(a) hydroxy,

(b) C_{1-3}alkoxy,

(c) methoxyethoxymethoxy,

(d) amino,

(e) C_{1-5}alkylamino,

(f) C_{2-5}alkanoylamino,

(g) phenyl or naphthyl, either unsubstituted or substituted with one or more of —OH or C_{1-3}alkyl, or

(h) a 6-membered nitrogen containing heteroaryl selected from pyridyl, pyrazinyl, and pyrimidinyl; or

(2)

where the alkyl is either straight, branched or cyclic, and either unsubstituted or substituted with items (a) through (h) as defined above.

4,929,638

C.25 [SUBSTITUTED(2-PROPENYL)]MILBEMYCINS

Christopher Dutton, and David Perry, both of New York, N.Y., assignors to Pfizer Inc., New York, N.Y.

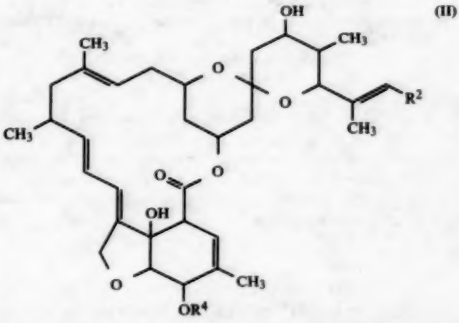
Division of Ser. No. 227,921, Aug. 3, 1988, abandoned. This application May 25, 1989, Ser. No. 356,952

Claims priority, application United Kingdom, Sep. 15, 1987, 8721647

Int. Cl.[5] A61K *31/365*; C07D *407/14*

U.S. Cl. 514—450 **11 Claims**

1. A compound having the formula:



(II)

wherein

R^2 is a 3 to 6 membered oxygen or sulphur containing heterocyclic ring which may be saturated or fully or partially unsaturated and which may be substituted by one or more C_1–C_4 alkyl groups or halogen atoms;

R^4 is hydrogen or methyl.

4,929,639

OXYGEN-CONTAINING HETEROCYCLIC COMPOUND

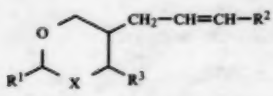
Hiroyuki Setoi; Akio Kuroda; Hirokazu Tanaka; Hideo Hirai; Hiroshi Marusawa, and Masashi Hashimoto, all of Tsukuba, Japan, assignors to Fujisawa Pharmaceutical Company, Ltd., Osaka, Japan

Filed Jun. 20, 1988, Ser. No. 208,665

Int. Cl.[5] A61K *31/335;* **C07D** *319/06*

U.S. Cl. 514—452 **9 Claims**

1. A compound of the formula:



(I)

wherein

R^1 is hydrogen or lower alkyl,

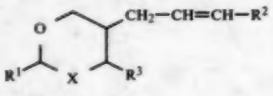
R^2 is carboxy(lower)alkyl or protected carboxy(lower)alkyl and

R^3 is —CH=N—R^4 in which R^4 is arylureido or arylthioureido and

X is —O—,

or pharmaceutically acceptable salt thereof.

8. A thromboxane A_2-antagonist pharmaceutical composition comprising an effective amount of a compound of the formula:



(I)

wherein

R^1 is hydrogen or lower alkyl,

R^2 is carboxy(lower)alkyl or protected carboxy(lower)alkyl and

R^3 is —CH=N—R^4 in which R^4 is arylureido or arylthioureido and

X is —O—,

or pharmaceutically acceptable salt thereof and pharmaceutically acceptable carrier.

4,929,640

MEDICAMENTS INTENDED FOR COMBINED USE IN THE IMPROVEMENT OF LYMPHOCYTE FUNCTION

R. Arnold Smith, Jackson, Miss., assignor to George D. McAdory, Jackson, Miss.

Filed Apr. 4, 1988, Ser. No. 177,121

Int. Cl.[5] A61K *31/34*

U.S. Cl. 514—474 **12 Claims**

1. A method for stimulating enhanced lymphocyte function in human beings requiring such treatment comprising administering to a said human being one part by weight of a dopamine agonist compound selected from the group consisting of bromocriptine, lergotrile and pergolide and at least 400 parts by weight of an ascorbate.

4,929,641

MERCAPTO-ACYLAMINO ACID ANTIHYPERTENSIVES

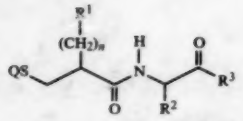
Martin F. Haslanger, Ridgewood; Bernard R. Neustadt, West Orange, and Elizabeth M. Smith, Verona, all of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Filed May 11, 1988, Ser. No. 192,435

Int. Cl.[5] C07C *149/40, 156/00, 157/09*

U.S. Cl. 514—506 **20 Claims**

1. A compound having the structural formula



wherein R^1 is phenyl substituted by alkyl, R^2 is alkyl-$S(O)_{0-2}(CH_2)_q$, R^3 is OR^7 wherein R^7 is hydrogen or lower alkyl, Q is hydrogen or $R^{10}CO$— wherein R^{10} is alkyl, n is 0–2 and q is 1–4.

4,929,642

PEST-COMBATING AGENTS BASED ON SUBSTITUTED 1,4-NAPHTHOQUINONES AND NEW SUBSTITUTED 1,4-NAPHTHOQUINONES

Werner Lindner, Cologne; Benedikt Becker, Mettmann; Robert Steffens, Cologne; Ulrike Wachendorff-Neumann, Leverkusen; Wilhelm Brandes, Leichlingen; Wilhelm Stendel, Wuppertal, and Stefan Dutzmann, Duesseldorf, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

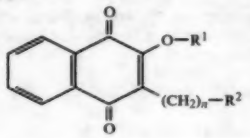
Filed Jun. 29, 1988, Ser. No. 212,816

Claims priority, application Fed. Rep. of Germany, Jul. 3, 1987, 3722018; Jan. 22, 1988, 3801743

Int. Cl.[5] A01N *9/00, 9/24*

U.S. Cl. 514—510 **6 Claims**

1. A method of combating agricultural pests comprising applying a pesticidally effective amount of a substituted 1,4-naphthoquinone on agricultural pests and/or their environment, said 1,4-naphthoquinone being of the formula



in which

n represents the numbers zero, 1 or 2,

R^1 represents hydrogen, t-butylcarbonyl or acetyl and

R^2 represents phenyl which is substituted by bromine, fluorine, chlorine, [C_1–C_4-alkyl,] trifluoromethyl, trifluoromethoxy, trifluoromethylsulphenyl, trifluoromethylsulphonyl or trimethylsilyl or cyclohexyl which is substituted by methyl, trifluoromethyl or trimethylsilyl or R^2 represents C_1–C_8-alkyl which is substituted by fluorine, chlorine or bromine.

4,929,643

BENZENESULFONAMIDE DERIVATIVES AND A PROCESS FOR THE PREPARATION THEREOF

Hans-Jochen Lang, Hofheim am Taunus; Max Hropot, Flörsheim am Main; Ernold Granzer, Kelkheim, and Bela Kerekjarto, Hofheim am Taunus, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Division of Ser. No. 184,963, Apr. 22, 1988. This application May 1, 1989, Ser. No. 345,168

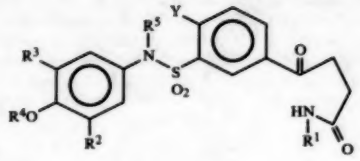
Claims priority, application Fed. Rep. of Germany, Apr. 24, 1987, 3713757

Int. Cl.[5] A61K *31/18;* **C07C** *143/80*

U.S. Cl. 514—603 **7 Claims**

1. An open-chain tautomeric form of a benzenesulfonamide derivative of the formula Ia

Ia



in which

R^1 is hydrogen, alkyl or alkenyl having 1–4 carbon atoms, or cycloalkyl having 3 to 5 ring members,

R^2 is hydrogen or an alkyl radical having 1 to 6 carbon atoms,

R^3 is an alkyl radical having 3 to 5 carbon atoms,

R^4 and R^5 represent hydrogen, a (C_1–C_3)-alkyl radical or an acyl radical of an aliphatic carboxylic acid having 1 to 3 carbon atoms, and

Y is hydrogen, methyl, trifluoromethyl, F or Cl.

4,929,644

THICKENED ORGANIC COMPOSITION HAVING BIOCIDAL ACTIVITY AND AN ADDITIVE FOR THICKENING AND IMPARTING BIOCIDAL ACTIVITY TO AN ORGANIC COMPOSITION

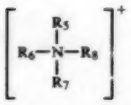
Ronald D. Guilbeaux, New Hope, Pa., assignor to Rheox, Inc., Hightstown, N.J.

Filed Oct. 24, 1986, Ser. No. 923,106
Int. Cl.[5] A61K *31/14*
U.S. Cl. 514—642 **37 Claims**

1. A thickened organic topical composition having biocidal activity comprising:

(a) an organic liquid;

(b) a first organophilic clay in an amount of from about 0.1 to about 10% by weight of the composition and which will increase the viscosity of the organic liquid; and said first organophilic clay being the reaction product of (i) a smectite-type clay having a cation exchange capacity of at least about 75 milliequivalents per 100 grams of clay, 100% active basis, and (ii) an organic cation having the following formula

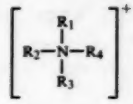


wherein R_5 is a linear or branched, saturated or unsaturated alkyl group having 8 to 22 carbon atoms; and R_6, R_7 and R_8 are selected from (a) linear branched alkyl groups having 1 to 22 carbon atoms; (b) aralkyl groups including fused ring moieties having linear or branched 1 to 22 carbon atoms in the alkyl portion of the structure; (c) aryl groups such as phenyl and substituted phenyl including fused ring aromatic substituents; (d) beta, gamma, unsaturated groups having 6 or less carbon atoms or hydroxyalkyl groups having 2 to 6 carbon atoms; and (e) hydrogen, with the proviso that none of R_6, R_7 or R_8 is benzyl; and

(c) a second organophilic clay in an amount of from about 0.03 to about 3.0% by weight of the composition, which is different from the first organophilic clay and which has biocidal activity, said second organophilic clay being the reaction product of

(i) a smectite-type clay having a cation exchange capacity of at least about 75 milliequivalents per 100 grams of clay, 100% active basis, and

(ii) an organic cation having the following formula



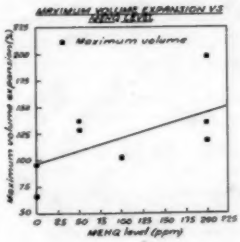
wherein R_1 is benzyl; R_2 is linear or branched, saturated or unsaturated alkyl group having 8 to 22 carbon atoms; and R_3 and R_4 are selected from (a) linear or branched alkyl groups having 1 to 22 carbon atoms; (b) aralkyl groups which are benzyl and substituted benzyl moieties including fused ring moieties having linear or branched 1 to 22 carbon atoms in the alkyl portion of the structure; (c) aryl groups such as phenyl and substituted phenyl including fused ring aromatic substituents; (d) beta, gamma, unsaturated groups having 6 or less carbon atoms or hydroxyalkyl groups having 2 to 6 carbon atoms; and (e) hydrogen.

4,929,645

EXPANDABLE AND EXPANDED PLASTIC MATERIALS AND METHODS FOR CASTING METAL CASTINGS EMPLOYING SUCH EXPANDED CELLULAR PLASTIC MATERIALS

Norman G. Moll, Sanford, and David R. Johnson, Midland, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 283,332, Dec. 12, 1988, Ser. No. 149,288, Jan. 28, 1988, Pat. No. 4,790,367, and Ser. No. 890,036, Jul. 28, 1986, abandoned. This application Oct. 30, 1989, Ser. No. 429,955
Int. Cl.[5] C08J *9/16*
U.S. Cl. 521—98 **6 Claims**



1. An expanded closed-cell cellular plastic material article comprising:

(A) a plastic material, polymerized from one or more monomers, containing a majority, by weight of the plastic material, of monomeric repeat units of the formula:

$$—CH_2CR'(COOR)—$$

wherein R is selected from the group consisting of alkanes having 1–4 carbon atoms (C), hydroxy alkanes having 1–4 C and cycloalkanes having 3–6 C, and R' is selected from the group consisting of CH_3 and C_2H_5;

(B) a volatile blowing agent entrapped in the expanded closed-cell cellular plastic material selected from the group consisting of:

(a) 2,2-dimethylbutane;

(b) 2,3-dimethylbutane;

(c) 2,2-dimethylbutane and 2,3-dimethylbutane

(d) mixtures of (a), (b) and (c) with 1-chloro-1,1-difluoroethane: and

(e) a mixture of at least 30 percent of (a), (b) and (c) by

weight of the mixture with one or more other volatile blowing agents.

4,929,646

POLYURETHANE FOAM PREPARED USING HIGH FUNCTIONALITY CELL OPENERS

Jerram B. Nichols, Alvin; Douglas Hunter, Lake Jackson; Ronald M. Herrington, Brazoria; John F. Serratelli, Lake Jackson, all of Tex., and David G. Carey, Sarnia, Canada, assignors to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 186,418, Apr. 26, 1988, Pat. No. 4,863,976. This application Nov. 14, 1988, Ser. No. 280,178

Int. Cl.[5] C08G *18/14*

U.S. Cl. 521—137 **10 Claims**

1. An active hydrogen-containing composition comprising

(a) at least one relatively high equivalent weight polyester polyol or polyether polyol containing at least about 50 weight percent of oxypropylene units, an amine-terminated derivative of such polyester or polyether polyol, or polymer polyol based on such polyester or polyether polyol or mixture thereof;

(b) a high functionality polyether polyol based on an initiator or initiator mixture having at least about 4.0 active hydrogens per molecule, which high functionality polyether polyol has a molecular weight of at least about 5000 and contains at least about 50 weight percent oxyethylene units and sufficient oxypropylene units to render it compatible with component (a) at the relative proportions thereof present in the reaction mixture, in an amount sufficient to measurably increase the proportion of open cells in a form made by reacting the active hydrogen-containing composition with a polyisocyanate as compared with a similar foam prepared in the absence of said high functionality polyether polyol.

4,929,647

COMPOSITIONS WHICH CAN BE CROSSLINKED BY RADIATION TO FORM ELASTOMERS

Christa Burger; Johann Müller, and Erhard Bosch, all of Burghausen, Fed. Rep. of Germany, assignors to Wacker-Chemie GmbH, Munich, Fed. Rep. of Germany

Filed Jul. 8, 1988, Ser. No. 221,960

Claims priority, application Fed. Rep. of Germany, Jul. 15, 1987, 3723421

Int. Cl.[5] C08L *83/08*; C08G *77/04*

U.S. Cl. 522—99 **28 Claims**

1. A composition which can be crosslinked by radiation to form elastomers comprising (a) an organopolysiloxane containing triorganosiloxane units of the formula

$$H_2C{=}CHCXOR^1SiR_2O_{\frac{1}{2}}$$

in which R is selected from the group consisting of monovalent hydrocarbon radicals and halogenated monovalent hydrocarbon radicals which are free of aliphatic multiple bonds, R^1 is selected from the group consisting of divalent hydrocarbon radicals and halogenated divalent hydrocarbon radicals which are free of aliphatic multiple bonds and X is selected from the group consisting of oxygen and sulphur, in which at least 80 percent of the siloxane units other than the triorganosiloxane units are diorganosiloxane units, where the SiC-bonded organic radicals of the diorganosiloxane units are selected from the group consisting of monovalent hydrocarbon radicals and halogenated monovalent hydrocarbon radicals, and wherein the organopolysiloxane (a) contains diorganosiloxane units one of those whose SiC-bonded bonded organic radicals contains an aliphatic carbon-carbon double bond, (b) a filler having a surface area of at least 50 m^2/g and (d) at least one organopolysiloxane resin comprising units selected from the group consisting of

(i) $R_3^2SiO_{\frac{1}{2}}$ and $R^2SiO_{3/2}$,

(ii) $R_3^2SiO_{\frac{1}{2}}$, $R^2SiO_{3/2}$ and $SiO_{4/2}$ and

(iii) $R_3^2SiO_{\frac{1}{2}}$ and $SiO_{4/2}$

where R^2 is independently selected from the group consisting of monovalent hydrocarbon radicals, halogenated monovalent hydrocarbon radicals and hydrogen, with the proviso that only one hydrogen atom is bonded to one and the same silicon atom, and an average of at least 4 Si-bonded hydrogen atoms are present in each molecule of the organopolysiloxane resin.

4,929,648

ALKALINE PHENOLIC RESOLE RESIN BINDERS

David R. Armbruster, Forest Park, and Kwok-Tuen Tse, Chicago, both of Ill., assignors to Acme Resin Corporation, Westchester, Ill.

Filed Mar. 24, 1989, Ser. No. 328,174

Int. Cl.[5] B22G *1/22*

U.S. Cl. 523—147 **15 Claims**

1. A binder composition which comprises:

(a) an aqueous alkaline solution of a phenolic resole resin, said aqueous solution having a solids content of from about 40% to about 75% by weight, said phenolic resole having an aldehyde:phenol molar ratio of from about 1.2:1 to about 2.6:1 and an alkali:phenol molar ratio of from about 0.2:1 to about 1.2:1; and

(b) an additive in an amount of at least about 1% by weight of the phenolic resole resin, said additive being soluble in the aqueous alkaline solution and having the general formula:

$$Ar{-}O{-}CHR^1{-}CHR^2{-}OH$$

where Ar = phenyl or phenyl substituted with one or more halogen, hydroxy, alkoxy or alkyl groups and where R^1 and R^2 may be the same or different and = hydrogen, alkyl or alkoxy.

4,929,649

COLD-SETTING MOULDING BINDERS AND THEIR USE (PHENOLS AND GASEOUS ACETALS)

Marek Torbus; Franz Jerman, both of Düsseldorf; Gerard Ladegourdie, Kaarst; Dirk Lingemann, Neuss; Willi Seiss, Neuss-Allerheiligen, and Aleksandar Vujevic, Ratingen, all of Fed. Rep. of Germany, assignors to Huttenes-Albertus Chemische Werke GmbH, Dusseldorf-Heerdt, Fed. Rep. of Germany

PCT No. PCT/EP87/00691, § 371 Date Jul. 13, 1988, § 102(e) Date Jul. 13, 1988, PCT Pub. No. WO88/03847, PCT Pub. Date Jun. 2, 1988

PCT Filed Nov. 7, 1987, Ser. No. 228,931

Claims priority, application Fed. Rep. of Germany, Nov. 20, 1986, 3639233

Int. Cl.[5] C08J *61/10*

U.S. Cl. 523—145 **10 Claims**

1. Cold-setting moulding binder for producing synthetic resin bonded foundry moulds, characterized in that the binder comprises a solution of aldehyde reactive phenol substances and strong acids, and the reaction product of said solution with gaseous acetal, said solution being first mixed with the moulding mixture and shaped, and the gaseous acetal being then passed through the shaped moulding mixture.

4,929,650

COATING MATERIAL FOR TENDON FOR PRESTRESSED CONCRETE

Makoto Kurauchi, Houston, Tex.; Michio Hashimoto, Chiba, Japan; Kiyoshi Hayasaki, Hyogo, Japan; Toshikazu Minami, Hyogo, Japan; Mutsuhiko Ohnishi, Hyogo, Japan, and Yohei Suzuki, Chiba, Japan, assignors to Mitsui Sekiyu Kagaku Kogyo Kabushiki Kaisha, Tokyo and Shinko Kosen Kogyo Kabushiki Kaisha, Amagasaki, both of, Japan

Filed Jul. 25, 1988, Ser. No. 223,588

Claims priority, application Japan, Jul. 27, 1987, 62-188608

Int. Cl.[5] G08G *59/68, 59/40, 59/56*

U.S. Cl. 523—455 10 Claims

1. A coating material for a tendon for prestressed concrete comprising 100 parts of epoxy resin, a latent curing agent, and 0.03 to 0.5 parts by weight of a curing accelerator, the latent curing agent being selected from the group consisting of dihydrazide, diphenyldiaminosulphone, dicyandiamide, 2-methylimidazole and derivatives thereof, and BF_3.amine complex, the curing accelerator being 2,4,6-tris(N,N-dimethylaminomethyl) phenol, the coating material being curable in at least more than three days at ambient temperature.

4,929,651

PROCESS FOR FORMING THICK BALLISTIC RESISTANT MATERIALS

James V. Gauchel; Edward L. Wilson, both of Newark, and Edward J. Kerle, Granville, all of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Division of Ser. No. 88,637, Aug. 24, 1987, Pat. No. 4,822,439. This application Nov. 10, 1988, Ser. No. 269,842

Int. Cl.[5] C08L *67/06*

U.S. Cl. 523—505 1 Claim

1. An impregnating composition having preselected controlled viscosity levels at preselected times, said impregnating composition being formed of (i) a solution of a low acid number isophthalic-maleic-propylene glycol polyester in a solvent of styrene or a solvent mixture of styrene and diallyl phthalate and (ii) calcium hydroxide, and (iii) 2,5-dimethyl-2,5-(2-ethylhexanoylperoxy) hexane, and, (iv) optionally tertiary butyl perbenzoate initiator and (v) optionally, alpha methylstyrene and (vi) water or glycerin or mixtures of water and gylcerin, the amount of said calcium hydroxide being about 0.5% to about 4% and the amount of said water or ghycerin or water and glycerin being about 0.02% to about 1% (based on solution of the polyester), said impregnating solution having a viscosity of between about 500 to about 4000 cps after the elapse of about no more than 27 minutes from the time of combining the ingredients to form said impregnating solution, and a viscosity in excess of about 15000 cps after the elapse of about 37 minutes from the time of forming said solution and a viscosity of about 50,000 to about 500,000 cps after about no more than one day from the combining of the ingredients to form the impregnating solution, said viscosity after said one day being substantially constant and in said 50,000–500,000 range, the viscosity being such that the impregnating composition can flow and conform to the shape of a mold when vacuum bag molded at a temperature of about 140 ° to about 150° F. and said composition having a self-sustaining curing initiation temperature of about 165° F.

4,929,652

POLYOLEFINS STABILIZED AGAINST DAMAGE CAUSED BY LIGHT

Francois Gugumus, Allschwil, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Apr. 27, 1988, Ser. No. 186,835

Claims priority, application Switzerland, May 5, 1987, 1708/87

Int. Cl.[5] C08K *5/34, 5/54*

U.S. Cl. 524—91 13 Claims

1. A polyolefin stabilized against damage caused by light and containing

(A) at least one polyalkylpiperidine light stabilizer,

(B) an organic salt of zinc or magnesium and

(C) either

(C_1) a UV absorber or

(C_2) a pigment or

(C_3) a UV absorber and a pigment.

4,929,653

STABILIZED PIGMENTED POLYPROPYLENE FIBER RESISTANT TO GAS FADE

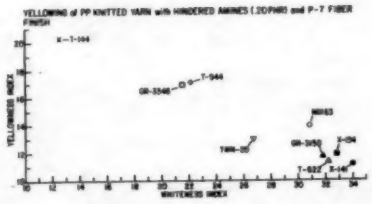
George Kletecka, Fairview Park; John T. Lai, Broadview Heights, and Pyong N. Son, Akron, all of Ohio, assignors to The BF Goodrich Company, Akron, Ohio

Filed Jul. 13, 1987, Ser. No. 73,244

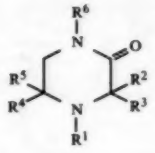
The portion of the term of this patent subsequent to Dec. 16, 2003, has been disclaimed.

Int. Cl.[5] C08K *5/34*

U.S. Cl. 524—96 2 Claims



1. A method for imparting gas fade resistance to pigmented polypropylene fiber, which method comprises mixing into a melt of said polypropylene, which is essentially free of an antioxidant, an effective amount sufficient to attenuate gas fade of said polypropylene fiber due to nitrogen oxide gases, of a hindered amine stabilizer selected from the group consisting of (i) a triazine ring substituted at each triazine ring carbon atom with a PSP moiety (ii) a bis-compound consisting of a C_2–C_{12} alkylene connecting two PSP moieties, and (iii) a polyalkylene polyamine having pendant triazine rings with substituents having at least one PSP moiety on each of the rings, said stabilizer containing as an essential portion of its basic structure a polysubstituted piperazin-2-one (PSP) moiety having the structure



wherein,

R^1 represents hydrogen, oxygen, C_1–C_{18} alkyl, C_1–C_6 hydroxyalkyl, C_2–C_{12} acyl, C_3–C_8 alkenyl, C_3–C_8 alkynyl, C_7–C_{12} aralkyl which is unsubstituted or substituted in the

alkyl moiety by hydroxyl, or C_1–C_8 alkanoyl or C_3–C_5 alkenoyl;

R^2, R^3, R^4 and R^5 independently represent hydrogen, C_1–C_{24} alkyl, C_1–C_{12} hydroxyalkyl, C_1–C_{12} haloalkyl, C_1–C_{12} cyanoalkyl, C_2–C_{12} aminoalkyl or iminoalkyl, C_3–C_{18} ether groups, C_4–C_{18} hydroxyalkyl ether or cyanoalkyl ether groups, C_7–C_{14} alkenyl or aralkyl, C_2–C_7 alkylene, and optionally containing a phosphite, or ester group, and which in combination, one with another, represent C_5–C_{14} cycloalkyl at least four of which C atoms are cyclized, and, optionally containing a keto, ester, amide, ether, thio or hydroxy group; but, only one of R^2 and R^3, and only one of R^4 and R^5 may be hydrogen;

and, R^6 represents a free valency through which the PSP moiety is connected to the remaining structure of the stabilizer;

and spinning said melt into fibers in the range from about 8 denier to about 30 denier.

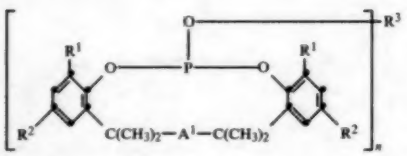
4,929,654

CYCLIC PHOSPHITES AND STABILIZED POLYMERIC COMPOSITIONS

Richard H. S. Wang, and Garry L. Myers, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 4, 1988, Ser. No. 253,168
Int. Cl.[5] C08K 5/524; C07D 9/15
U.S. Cl. 524—117 **22 Claims**

1. A compound having the formula



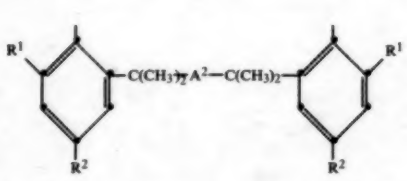
(I)

wherein

each R^1 is independently selected from hydrogen, alkyl, aralkyl, aryl, carboxy, alkoxycarbonyl or halogen;

each R^2 is independently selected from hydrogen, alkyl, aralkyl, alkoxy, aryl, carboxy, alkoxycarbonyl or halogen;

R^3 is (a) hydrogen, alkyl, cyclohexyl or aryl when n is 1; (b) alkylene, cyclohexylene, cyclohexylenedialkylene, arylene or a divalent group having the formula



wherein

R^1 and R^2 are defined above and

A^2 is 1,3- or 1,4-phenylene when n is 2; (c) alkanetriyl when n is 3; or (d) alkanetetrayl when n is 4;

n is 1, 2, 3 or 4; and

A^1 is 1,3-phenylene.

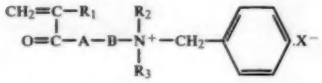
4,929,655

PROCESS FOR PRODUCTION OF WATER-SOLUBLE POLYMER DISPERSION

Hisao Takeda, Zama, and Mutsumi Kawano, Chigasaki, both of Japan, assignors to Kyoritsu Yuki Co., Ltd., Japan

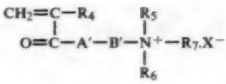
Continuation-in-part of Ser. No. 798,739, Nov. 15, 1985, abandoned. This application Dec. 20, 1988, Ser. No. 286,976
Claims priority, application Japan, Nov. 19, 1984, 59-244152; Jul. 18, 1985, 60-158709; Jul. 18, 1985, 60-158711
Int. Cl.[5] C08F 2/16
U.S. Cl. 524—458 **8 Claims**

1. A process for the production of a water-soluble polymer dispersion which is characterized by polymerizing water-soluble monomers of 5 to 100 mole % of a cationic monomer represented by the following formula (I), 0 to 50 mole % of another cationic monomer represented by the following formula (II) and 0 to 95 mole % of (meth)acrylamide in the presence of 1 to 10% by weight of an organic high-molecular multivalent cation comprising a water soluble polymer containing at least a monomer of formula (II) based on the total weight of the monomers in a multivalent anionic salt aqueous solution having a concentration of 15% by weight or more:



(I)

wherein R_1 is H or CH_3; each of R_2 and R_3 is an alkyl group having 1 to 3 carbon atoms; A is an oxygen atom or NH; B is an alkylene group having 2 to 4 carbon atoms or a hydroxypropylene group; and X^- is an anionic counterion,



(II)

wherein R_4 is H or CH_3; each of R_5 and R_6 is an alkyl group having 1 or 2 carbon atoms; R_7 is H or an alkyl group having 1 or 2 carbon atoms; A′ is an oxygen atom or NH; B′ is an alkylene group having 2 to 4 carbon atoms or a hydroxypropylene group; and X^- is an anionic counterion.

4,929,656

BLENDS COPOLYESTER ELASTOMERS AND CHLORINATED POLYETHYLENE

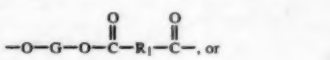
Michael D. Golder, Allendale, N.J., assignor to Hoechst Celanese Corporation, Summit, N.J.

Filed May 11, 1989, Ser. No. 350,212
Int. Cl.[5] C08L 67/02, 71/02
U.S. Cl. 524—195 **15 Claims**

1. An elastomeric composition comprising a blend of:

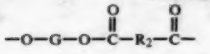
(A) about 60 to about 95 weight percent thermoplastic copolyester elastomer; and

(B) about 5 to about 40 weight percent of a chlorinated polyethylene, said weight percents being based on the total weight of (A) and (B), wherein (A), the segmented copolyester elastomer, is comprised of a multiplicity of recurring long chain ester units and short chain ester units joined head to tail through ester linkages, said long chain units being represented at least one of the structures:



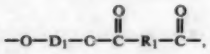
(a)

-continued

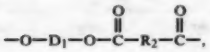


(b)

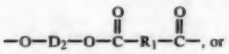
and the short chain ester units are represented by at least one of the following structures:



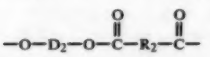
(c)



(d)



(e)



(f)

wherein G is a divalent radical remaining after the removal of the terminal hydroxyl groups from a long chain polymeric glycol having a molecular weight above about 400 and a melting point below about 55° C.;

wherein R_1 and R_2 are different divalent hydrocarbon radicals remaining after removal of carboxyl groups from different dicarboxylic acids, each having a molecular wright less than about 300; and

wherein D_1 and D_2 are different divalent radicals remaining after removal of hydroxyl groups from different low molecular weight diols having molecular weights less than about 250, provided said short chain segments amount to between about 25 and about 95 percent by weight of the copolyester and wherein about 50 to about 100 percent of the short chain ester units are identical; and

wherein (B) the chlorinated polyethylene, is derived from high density polyethylene chlorinated with about 25 to about 45 weight percent chlorine.

4,929,657

SUBSTITUTED AMINOXY-PROPIONAMIDES

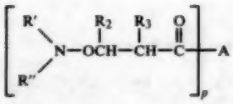
Ramanathan Ravichandran, Yonkers, N.Y., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 848,106, Apr. 4, 1986, Pat. No. 4,760,179. This application Apr. 25, 1988, Ser. No. 185,595

Int. Cl.[5] C07C *103/22*; C10M *133/16*

U.S. Cl. 524—196 **11 Claims**

1. A composition of matter comprising an organic polymeric material subject to oxidative, thermal and actinic degradation stabilized with an effective stabilizing amount of a compound of the formula



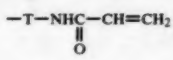
wherein

p is 1 to 4;

R^1 and R'' are independently hydrogen, alkyl of 1 to 36 carbon atoms, cycloalkyl of 5 to 12 carbon atoms, aralkyl of 7 to 9 carbon atoms or said aralkyl substituted by alkyl of 1 to 36 carbon atoms,

R_2 and R_3 are independently hydrogen or alkyl of 1 to 12 carbon atoms;

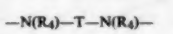
A, when p=1, is a group NHR_4, wherein R_4 is hydrogen, amino, alkyl of 1 to 18 carbon atoms or



and

T is a direct bond or alkylene of 1 to 10 carbon atoms;

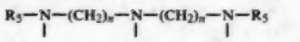
A, when p=2, is a group



and

T and R_4 have the meanings given above;

A, when p=3, is a group of the formula

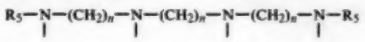


and

n is 2 to 6 and R_5 is hydrogen or alkyl of 1 to 4 carbon atoms;

and

A, when p=4, is a group of the formula



and

R_5 and n have the meanings given above.

4,929,658

COMPOSITION FOR LIQUID CRYSTAL ALIGNING AGENT

Noriaki Kohtoh; Yoshihiro Tsuruoka; Toyohiko Abe, and Hiroyoshi Fukuro, all of Ichihara, Japan, assignors to Nissan Chemical Industries Ltd., Tokyo, Japan

Filed Apr. 7, 1989, Ser. No. 334,571

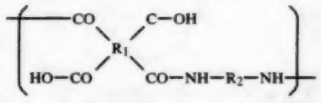
Claims priority, application Japan, Apr. 14, 1988, 63-92601; Apr. 14, 1988, 63-92602

Int. Cl.[5] C08K *5/20*

U.S. Cl. 524—219 **5 Claims**

1. A composition for a liquid crystal aligning agent characterized by that it consists essentially of:

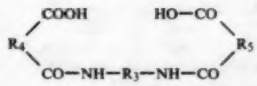
a polyimide resin precursor having repeating units represented by the formula (I):



(I)

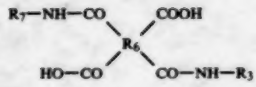
wherein R_1 denotes an organic group constituting a tetracarboxylic acid or its derivative; and R_2 represents a divalent organic group constituting a diamine; and

a precursor of a diimide compound represented by the formula (II) or (III):



(II)

wherein R_3 denotes a divalent organic group constituting a diamine; each of R_4 and R_5 represents an organic group constituting a dicarboxylic acid containing an alkyl group having 6 to 20 carbon atoms, or its derivative,



(III)

wherein R_6 denotes an organic group constituting a tetracarboxylic acid or its derivative; and each of R_7 and R_8 represents an organic group constituting a monoamine containing an alkyl group having 6 to 20 carbon atoms.

4,929,659

SUBSTITUTED AMINOXYETHYL SULFOXIDES AND SULFONES

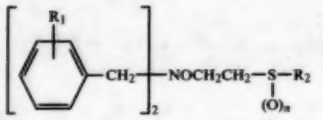
Ramanathan Ravichandran, Yonkers, N.Y., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 133,205, Dec. 15, 1987, abandoned, which is a continuation of Ser. No. 809,637, Dec. 16, 1985, abandoned. This application Jul. 14, 1988, Ser. No. 220,333

Int. Cl.[5] C08K 5/41; C09K 15/26

U.S. Cl. 524—155 **16 Claims**

1. A composition of matter comprising polymer, resin or lubrication oil subject to oxidative, thermal and actinic degradation stabilized with an effective stabilizing amount of a compound of the formula

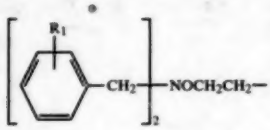


wherein

n is 1 or 2,

R_1 is hydrogen, alkyl of 1 to 36 carbon atoms, cycloalkyl of 5 to 12 carbon atoms, phenyl, aralkyl of 7 to 9 carbon atoms or said aralkyl substituted by alkyl of 1 to 36 carbon atoms, and

R_2 is alkyl of 1 to 36 carbon atoms, cycloalkyl of 5 to 12 carbon atoms, phenyl, aralkyl of 7 to 9 atoms, said aralkyl substituted by alkyl of 1 to 36 carbon atoms or the group



wherein R_1 is as defined hereinabove.

4,929,660

ACRYLIC ADHESIVE COMPOSITIONS HAVING IMPROVED STABILITY

Samuel J. Chen, Lexington, Mass., assignor to The Kendall Company, Boston, Mass.

Filed Mar. 14, 1986, Ser. No. 839,759

Int. Cl.[5] C08L 5/32

U.S. Cl. 524—236 **8 Claims**

1. An acrylic composition comprising at least one free radical acrylic monomer and a free radical initiator, said composition further including a stabilizer mixture for providing improved shelf life for said composition, said stabilizer mixture comprising effective amounts of: (1) a hydroquinone polymerization inhibitor; (2) a metal chelating agent; and (3) a N,N-diarylalkyl or an N,N-dialkyl hydroxylamine-free radical scavenger.

4,929,661

AQUEOUS COATING COMPOSITION CONTAINING A FUNCTIONAL ORGANIC COMPOUND, A CURING AGENT, AND A DISPERSING AGENT

Arie Noomen, and Petrus J. Peters, both of Voorhout, Netherlands, assignors to Akzo N.V., Arnhem, Netherlands

Continuation of Ser. No. 100,670, Sep. 24, 1987, abandoned. This application Oct. 20, 1989, Ser. No. 425,515

Claims priority, application Netherlands, Sep. 24, 1986, 8602412; Jul. 20, 1987, 8701708

Int. Cl.[5] C08K 5/17

U.S. Cl. 524—259 **26 Claims**

1. A water-dispersible aqueous coating composition based on a polyacetoacetate-comprising compound, said coating composition comprising:

(a) an organic compound having at least 2 acetoacetate groups, wherein said organic compound is comprised of the reaction product of a polyol having two or more hydroxyl groups with a reactant selected from the group consisting of diketene and alkyl acetoacetate;

(b) a curing agent comprising a polyamino amide having an amine number of 60–1,000 built up from a polyamine having 2–6 primary amino groups and 2–20 carbon atoms and a reactant selected from the group consisting of monocarboxylic acid, dicarboxylic acid and combinations thereof, wherein the carboxylic acid comprises from 2 to 40 carbon atoms; and

(c) a dispersing agent selected from the group consisting of a nitroalkane having 1–6 carbon atoms; an organic compound occurring in at least 2 tautomeric forms, and in one of the tautomeric forms a labile hydrogen atom is linked to a carbon atom and which compound contains at least one carboxyl group or sulphonyl group; a formic acid ester having a solubility of at least 0.2 g in 100 g of water having a temperature of 20° C., with the exception of ter. butyl formiate; and combinations thereof.

4,929,662

PROCESS FOR THE PREPARATION OF POLYMER PARTICLES POSSESSING, IMPLANTED ON THEIR SURFACE, AMPHOPHILIC MOLECULES CARRYING ION-FORMING OR REACTIVE GROUPS, AND A PROCESS FOR THE PREPARATION OF A LATEX COMPRISING THESE PARTICLES

Roger Hogenmuller, Sainte Foy les Lyon; Bernard Chauvel, Ermont, and Jean-Claude Daniel, Fontenay/Sous/Bois, all of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed May 6, 1988, Ser. No. 191,176

Claims priority, application France, May 11, 1987, 87 06550

Int. Cl.[5] C08K 5/06

U.S. Cl. 524—376 **19 Claims**

1. A process for the preparation of an aqueous dispersion of polymer particles possessing, implanted on their surface, amphiphilic molecules carrying ion-forming or reactive groups, comprising the following steps:

(1) diffusing, into a previously prepared aqueous seeding dispersion of polymer particles, an organosoluble polymerization initiator having a solubility in water of from about 10^{-3} to 10^{-2} g/liter of water, said diffusion being carried out at a temperature below the decomposition temperature of said initiator;

(2) swelling said particles of said dispersion thus obtained by introducing a monomer composition comprising (a) at least one monomer and (b) at least one amphiphilic compound having an HLB greater than or equal to 10 and a molecular weight greater than or equal to 400, wherein the hydrophilic block of said amphiphilic compound is a hydrophilic oligomer block terminated by at least one ion-forming or reactive group, said swelling being carried out by the monomer component (a) with a quantity of monomer composition less than the maximum quantity of said composition which said seeding dispersion can ab-

sorb, at a temperature below the decomposition temperature of said initiator; and

(3) polymerizing said at least one monomer of said monomer composition at a temperature at least equal to the decomposition temperature of said initiator, the nature of said seeding polymer and the nature of said at least one monomer of said monomer composition, being such that the final polymer has a glass transition temperature Tg above about 40° C., said polymerzation resulting in the implantation of said amphiphilic compound (b) of the monomer composition in the surface layer of the polymer particles.

4,929,663

FIRE RETARDANT IMPACT MODIFIED CARBONATE POLYMER COMPOSITION

Michael K. Laughner, Lake Jackson, and Samuel A. Ogoe, Angleton, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 46,364, May 6, 1987, Pat. No. 4,786,686. This application Mar. 20, 1989, Ser. No. 325,418

Int. Cl.[5] **C08K** *3/30*

U.S. Cl. 524—423 **4 Claims**

1. A flame retardant impact resistant aromatic polycarbonate polymer composition consisting essentially of:

(a) one or more aromatic carbonate polymers;

(b) an impact modifying quantity of a rubbery polymer selected from the group consisting of styrene/methylmethacrylate copolymer grafted homopolymers and interpolymers of butadiene;

(c) from 0.01 to 10 percent by weight of the total composition of a fluorine containing polymer of the fibril forming type; and

(d) from 0.001 to 1 percent by weight of a metal salt of an inorganic acid.

4,929,664

CROSSLINKABLE SILICONE POLYMERS WITH TALC REINFORCING AGENTS HAVING IMPROVED NON-SAG AND MODULUS PROPERTIES

Herbert M. Turk, Willoughby, Ohio, assignor to The B.F. Goodrich Company, Akron, Ohio

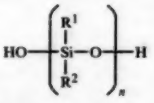
Filed Dec. 19, 1988, Ser. No. 286,099

Int. Cl.[5] **C08K** *3/34*

U.S. Cl. 524—451 **8 Claims**

1. A silicone sealant system comprising;

a silanol terminated silicone polymer of the formula



wherein R^1 and R^2, independently, are alkyl C_1 to C_6 or aryl or alkylaryl C_6 to C_{12}, wherein n is a value such that the viscosity of the polymer should be from 5,000 to 500,000 centistokes;

from about 5 to about 25 parts by weight per 100 parts polymer of a crosslinking agent or a curative;

from about 10 to about 100 parts by weight per 100 parts polymer of a non-reactive silicone fluid having a viscosity of 50 to 20,000 centistokes;

from about 0.1 to about 5 parts by weight per 100 parts polymer of an adhesion promoter;

from about 0 to about 3 parts by weight per 100 parts polymer of a catalyst;

and a reinforcing agent comprising a platy talc, said silicone sealant system having a sag of 0.08 inch or less as measured by he Boeing Jig Test without the use of a fumed silica and having a stress at 50 percent strain of at least 40 psi.

4,929,665

THERMOPLASTIC RESIN COMPOSITION

Toshio Inoue, Osaka; Takayuki Mine, Nara; Hitoshi Izutsu, Osaka; Toshihide Yamaguchi, Izumi-ohtsu; Fumihiro Kobata, Izumi, and Juheiji Kawabata, Takaishi, all of Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo, Japan

Filed Jan. 19, 1988, Ser. No. 145,552

Claims priority, application Japan, Jan. 20, 1987, 62-10938; Feb. 20, 1987, 62-35576; Mar. 6, 1987, 62-49911

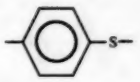
The portion of the term of this patent subsequent to Mar. 29, 2005, has been disclaimed.

Int. Cl.[5] **C08G** *75/20*; **C08L** *81/06, 81/02*

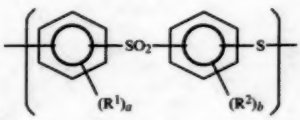
U.S. Cl. 524—500 **17 Claims**

10. A resin composition comprising:

(a) 99 to 1 parts by weight of a block copolymer composed of polyphenylene sulfide segments and polyphenylene sulfide sulfone segments, said polyphenylene sulfide segments comprising a polymer having at least 70 mole % of recurring structural units of the formula



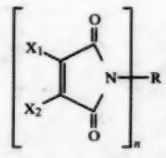
and said polyphenylene sulfide sulfone segments comprising a polymer having at least 70 mole % of recurring structural units of the formula



wherein groups bonded to both terminals of the polymer are ortho- or para- to the sulfone group, R^1 and R^2 represent hydrogen or a C_1–C_8 alkyl group and/or an aryl group, and a and b are integers of 0 to 4;

(b) 1 to 99 parts by weight of another thermoplastic resin;

(c) 0.01 to 20 parts by weight, per 100 parts by weight of the components (a) and (b) combined, of at least one compound selected from the group consisting of maleimide compounds represented by the formula



wherein R represents an aromatic, alicyclic or aliphatic organic group, X_1 and X_2 represent hydrogen, halogen or an alkyl group, and n is 1 to 10; and

(d) 0 to 280 parts by weight, per 100 parts by weight of the components (a) and (b) combined, of an inorganic filler.

11. The composition of claim 10, wherein said another thermoplastic resin is at least one thermoplastic resin selected from the group consisting of polyesters, polyphenylene sulfides, polyphenylene sulfide sulfones, polyamides, polyimides, polyphenylene oxides, polycarbonates, polysulfones, polyetherketones and alpha-olefin polymers.

4,929,666

FLUOROCARBON CONTAINING, REACTIVE POLYMERIC SURFACTANTS AND COATING COMPOSITIONS THEREFROM

Donald L. Schmidt; Perry J. McCrackin, and Charles E. Coburn, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 49,490, May 14, 1987, abandoned. This application Sep. 1, 1989, Ser. No. 402,176

Int. Cl.[5] C08L *39/00*

U.S. Cl. 524—516 **11 Claims**

1. A water-based crosslinkable coating composition comprising an aqueous solution of

(a) a water-soluble or water-dispersible crosslinkable polymeric surfactant having (1) at least one pendant fluorocarbon moiety and (2) at least one pendant ionic moiety which is capable of reacting with a counterion to form a crosslinked polymer, and

(b) a polymeric crosslinking agent having an ionic or potentially ionic moiety counterion capable of reacting with the ionic moiety of the surfactant;

said composition having the capability of forming a uniform, thin film, on a surface to be coated, and the capability, on crosslinking, to form a uniform, thin coating having a critical surface tension less than about 19 dynes/cm.

4,929,667

URETHANE PREPOLYMER COMPOSITION AND A POLYURETHANE COATING COMPOSITION SYSTEM

Kazuki Ban, and Norio Oyabu, both of Nobeoka, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Feb. 1, 1989, Ser. No. 304,607

Claims priority, application Japan, Feb. 1, 1988, 63-19542

Int. Cl.[5] C08G *18/10*

U.S. Cl. 524—718 **14 Claims**

1. A urethane prepolymer composition comprising:

(a) a terminal isocyanate group-containing urethane prepolymer obtained by reacting a polytetramethylene glycol having a number average molecular weight of from 700 to 1500 with at least one diisocyanate selected from the group consisting of an aliphatic diisocyanate and an alicyclic diisocyanate at an equivalent ratio of the isocyanate groups of said diisocyanate to the hydroxyl groups of said glycol of at least 5/1, and

(b) a terminal isocyanate group-containing urethane prepolymer obtained by reacting at least one polycaprolactone having at least two terminal hydroxyl groups, said polycaprolactone being selected from the group consisting of a polycaprolactone diol and a polycaprolactone polyol each having a number average molecular weight of from 500 to 1500, with at least one diisocyanate selected from the group consisting of an aliphatic diisocyanate and an alicyclic diisocyanate at an equivalent ratio of the isocyanate groups of said diisocyanate to the hydroxyl groups of said polycaprolactone of at least 5/1,

the weight ratio of (a) to (b) being in the range of from 80/20 to 20/80.

4,929,668

AQUEOUS SYNTHETIC DISPERSIONS

Winfried Zeibig, Moers, and Heinrich Hüskes, Krefeld, both of Fed. Rep. of Germany, assignors to Deutsche Texaco Aktiengesellschaft, Hamburg, Fed. Rep. of Germany

Filed Jul. 21, 1988, Ser. No. 222,582

Claims priority, application Fed. Rep. of Germany, Jul. 28, 1987, 3724858

Int. Cl.[5] C08J *5/01*

U.S. Cl. 524—745 **9 Claims**

1. An aqueous dispersion comprising an emulsion of a copolymer composed of:

(a) 20 to 60 weight percent of a monomer which is a vinyl benzene, a C_1 to C_4 substituted vinyl benzene, a t-butyl acrylate, an ester of alkylmethacrylic acid and C_1–C_5 monoalcohol, a vinyl ester of a monocarboxylic acid, or a mixture of said monomers, each of the individual monomers having a homopolymer glass temperature higher than 35° C.;

(b) 25 to 55 weight percent of a monomer which is an ester of acrylic acid and C–C8 monoalcohol, an ester of methacrylic acid with a C_5–C_{10} monoalcohol, a vinyl ester of a C_1–C_{11} monocarboxylic acid, or a mixture of said monomers, each of the individual monomers having a homopolymer glass temperature of less than 35° C.;

(c) 8 to 15 weight percent of an ester of methacrylic acid and a C_2–C_8 alkane polyol, or an ester of acrylic acid and a C_2–C_8 alkane polyol;

(d) 8 to 15 weight percent of a methacrylamide or acrylamide of the general formula

$$CH_2{=}C(R_1){-}CONCH{-}A{-}O{-}R_2$$

wherein R_1 is hydrogen or methyl, A is C_1–C_4 n- or isoalkylene and R_2 is C_1–C_4-alkyl; and

(e) 0.5 to 5 weight percent of an alpha, beta-unsaturated monocarboxylic acid having 3 to 5 carbon atoms or of an alpha, beta-unsaturated dicarboxylic acid with 3 to 5 carbon atoms.

4,929,669

ORGANOSILOXANE COMPOSITIONS YIELDING ELASTOMERS WITH IMPROVED RECOVERY FOLLOWING PROLONGED COMPRESSION

Jary D. Jensen, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Dec. 27, 1988, Ser. No. 289,891

Int. Cl.[5] C08L *83/04*

U.S. Cl. 524—861 **14 Claims**

1. In an improved multi-part organosiloxane composition comprising

A. at least one liquid diorganopolysiloxane containing at least two silicon-bonded vinyl radicals per molecule,

B. an amount sufficient to cure said composition of an organohydrogensiloxane that is miscible with (A), and contains an average of more than two silicon bonded hydrogen atoms per molecule,

C. a platinum-containing hydrosilation catalyst in an amount sufficient to promote curing of said composition at a temperature of from ambient to 250 degrees C., where said organohydrogensiloxane and said hydrosilation catalyst are located in different parts of said multi-part curable composition, and

D. from 10 to 60 weight percent, based on the weight of said composition, of a reinforcing silica filler, the improvement comprising (1) the presence in at least one part of said multi-part composition of at least 0.2 percent, based on the total weight of said composition, of a vinyl specific organic peroxide and (2) for cured elastomers prepared from said composition, a recovery from prolonged compression of at least 90 composition of the initial sample thickness in the absence of post-curing, said recovery being determined in accordance with ASTM test method D395.

4,929,670

POLYSACCHARIDES CONTAINING AROMATIC ALDEHYDES AND THEIR DERIVATIZATION VIA AMINE-ALDEHYDE INTERACTIONS

Robert L. Billmers, Stockton; David M. Del Giudice, Somerset; Martin M. Tessler, Edison, and Michael J. Hasuly, South Plainfield, all of N.J., assignors to National Starch and Chemical Investment Holding Corporation, Bridgewater, N.J.

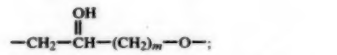
Division of Ser. No. 112,634, Oct. 26, 1987, Pat. No. 4,839,449. This application Apr. 14, 1989, Ser. No. 338,827

Int. Cl.[5] C08F *89/00*; C08L *1/00*; D02G *3/02*; A61K *37/02*

U.S. Cl. 525—54.1 17 Claims

1. A polysaccharide derivative having the structure Sacch—O—Z—Ar—CH=N—Y or

where Sacch—O— represents a polysaccharide molecule; Z is $-(CH_2)n-$ or



Ar is a divalent aromatic group; Y is a multivalent group derived from a water-soluble protein containing more than one primary amine group; n is one or greater; and m is zero or greater.

4,929,671

ALLYLIC SIDE CHAIN-CONTAINING SOLID PHASE SYSTEMS, PROCESSES FOR THE PREPARATION THEREOF AND THE USE THEREOF IN SOLID PHASE REACTIONS

Horst Kunz, Mainz-Drais, and Berthold Dombo, Wiesbaden-Medenbach, both of Fed. Rep. of Germany, assignors to Orpengen Medizinisch-Molekularbiologische Forschungsgesellschaft mbH, Heidelberg, Fed. Rep. of Germany

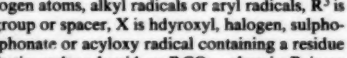
Filed Jun. 10, 1988, Ser. No. 205,453

Claims priority, application Fed. Rep. of Germany, Jun. 19, 1987, 3720269; Feb. 5, 1988, 3803545

Int. Cl.[5] C07K *1/04, 17/06, 17/08, 17/14*

U.S. Cl. 525—54.11 21 Claims

1. A solid phase system comprising allylic side chains bound to a solid carrier material, said system having the formula:



wherein F is a solid carrier material, R^1 and R^2 are hydrogen atoms, halogen atoms, alkyl radicals or aryl radicals, R^3 is a linking group or spacer, X is hdyroxyl, halogen, sulphonate. phosphonate or acyloxy radical containing a residue of an aliphatic carboxyl acid or RCO-, wherein R is an organic radical bound to the carbonyl group, and n is the number of allylic side chains bound to said carrier material.

4,929,672

POLYCARBONATE MODIFIED WITH A GRAFTED OLEFIN COPOLYMER

Michael K. Laughner, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed May 4, 1989, Ser. No. 347,846

Int. Cl.[5] C08L *51/08*

U.S. Cl. 525—63 24 Claims

1. A composition of matter comprising, in admixture, an aromatic polycarbonate and an olefin/carbon monoxide copolymer grafted with one or more vinyl or vinylidene monomers or polymers or copolymers of such monomers or mixtures thereof.

4,929,673

POLYCARBONATE/STYRENIC BLENDS MODIFIED WITH A GRAFTED OLEFIN COPOLYMER

Michael K. Laughner, Lake Jackson; Gerald M. Lancaster, Freeport, both of Tex., and Yun C. Sun, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 4, 1989, Ser. No. 347,847

Int. Cl.[5] C08L *51/08*

U.S. Cl. 525—63 28 Claims

1. A composition of matter comprising, in admixture, an aromatic polycarbonate, a styrenic thermoplastic resin and an olefin/carbon monoxide copolymer grafted with one or more vinyl or vinylidene monomers or polymers or copolymers of such monomers or mixtures thereof.

4,929,674

MIXTURES OF THERMOPLASTIC POLY(ESTER) CARBONATES WITH THERMOPLASTIC POLYURETHANES

Werner Nouvertné; Franz-Josef Gielen; Peter Tacke, all of Krefeld; Ulrich Grigo, Kempen; Bernd Quiring, Leverkusen, and Christian Lindner, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Apr. 4, 1989, Ser. No. 332,997

Claims priority, application Fed. Rep. of Germany, Apr. 12, 1988, 3812051

Int. Cl.[5] C08L *75/04*

U.S. Cl. 325—66 6 Claims

1. Mixtures containing

(A) 45 to 87% by weight thermoplastic, aromatic poly(ester) carbonates,

(B) 30 to 12% by weight thermoplastic polyurethanes and

(C) 25 to 1% by weight graft polymer obtained by the known grafting of

(C1) 5 to 30 parts by weight alkyl (meth)acrylates onto '(C2) 95 to 70 parts by weight crosslinked diene rubbers, the sum of (C1)+(C2) being 100 parts by weight and the average particle diameter d_{50} of the crosslinked diene rubbers (C2) being from 0.2 μm to 0.6 μm.

4,929,675

THERMOPLASTIC RESIN COMPOSITION

Hiroomi Abe; Taichi Nishio; Yasurou Suzuki; Takashi Sanada, and Mitsuji Tsuji, all of Chiba, Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan

Filed Jun. 7, 1988, Ser. No. 203,775

Claims priority, application Japan, Jun. 12, 1987, 62-147349

Int. Cl.[5] C08L *53/02, 77/06*

U.S. Cl. 525—66 8 Claims

1. A thermoplastic resin composition which comprises

100 parts by weight of a composition (A) which comprises 5–95% by weight of a polyphenylene ether resin and 95–5% by weight of a polyamide,

5–50 parts by weight of a modified rubber-like material (B) wherein 5–100 parts by weight of an aromatic vinyl compound is graft-polymerized with 100 parts by weight of a rubber-like material, the grafting ratio of the aromatic vinyl compound being 50% by weight or more, and

0.05–20 parts by weight of an α, β-unsaturated carboxylic acid or its derivative (C).

4,929,676

IMPACT AND CHEMICAL RESISTANT POLYCARBONATE BLEND

Michael K. Laughner, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Apr. 24, 1989, Ser. No. 342,145
Int. Cl.[5] C08L 69/00
U.S. Cl. 525—67 20 Claims

1. A thermoplastic molding composition comprising:

A. an aromatic polycarbonate;

B. an aromatic polyester;

C. a copolymer of one or more ethylenically unsaturated monomers with carbon monoxide; and

D. a polyalkylene oxide rubber having a glass transition temperature (Tg) lower than 0° C.

4,929,677

ACETOPHENONE BASED BISPHENOL POLYARYLATE RESINS

Barry D. Dean, Broomall, and Robert G. Gastinger, Brookhaven, both of Pa., assignors to Arco Chemical Technology, Inc., Wilmington, Del.

Continuation of Ser. No. 848,658, Apr. 7, 1986, abandoned. This application Mar. 8, 1988, Ser. No. 165,649
Int. Cl.[5] E08L 67/02, 35/06
U.S. Cl. 525—151 3 Claims

1. A moldable polymer composition comprising:

(a) from about 1 to about 99 weight percent of a polyarylate containing in mole percent from about 15 to about 35 isophthalic acid or a reactive derivative of isophthalic acid, from about 15 to about 35 terephthalic acid, or a reactive derivative of isophthalic acid and about 50 of at least one polyarylate material selected from the group consisting of 1,1-bis(4-hydroxyphenyl)-1-phenylethane; 1,1-bis(4-hydroxyphenyl)-diphenyl methane; and 1,1-bis(4-hydroxyphenyl) fluorenone; and

(b) from about 99 to about 1 weight percent of a copolymer containing in mole percent from about 75 to about 87 recurring units of a monovinyl aromatic monomer and from about 13 to about 25 recurring units of an N-arylmaleimide monomer, wherein the polyarylate and the copolymer are fully compatible upon blending and the resulting polymer composition exhibits a single phase and a single glass transition temperature value.

4,929,678

RUBBER COMPOSITION AND A SOLID GOLF BALL OBTAINED THEREFROM

Akihiko Hamada, Kakogawa; Hidenori Hiraoka, Kobe; Yoshinobu Nakamura, Nishinomiya, and Hiroshi Ohtsuru, Akashi, all of Japan, assignors to Sumitomo Rubber Industries, Ltd., Hyogo, Japan

Filed Jan. 14, 1988, Ser. No. 143,768
Claims priority, application Japan, May 2, 1987, 62-109147
Int. Cl.[5] C08F 8/42
U.S. Cl. 525—193 16 Claims

1. A rubber composition for a solid golf ball having excellent durability and rebound properties comprising:

(a) a rubber component comprising at least 40% by weight of a polybutadiene rubber which has a Mooney viscosity $\{ML_{1+4}(100° C.)\}$ of 50 to 70 and a cis-1,4 bond content of at least 80%,

(b) a co-crosslinking agent, and

(c) a peroxide.

4,929,679

RUBBER COMPOSITION FOR TIRE TREAD

Shuichi Akita; Fumitoshi Suzuki, both of Yokohama; Yasushi Kikuchi, Odawara, and Hideyuki Oishi, Hiratsuka, all of Japan, assignors to Nippon Zeon Co., Ltd. and The Yokohama Rubber Co., Ltd., both of Tokyo, Japan

Filed Mar. 22, 1989, Ser. No. 327,457
Claims priority, application Japan, Apr. 2, 1988, 63-80253
Int. Cl.[5] C08L 7/00, 9/00, 9/06
U.S. Cl. 525—194 4 Claims

1. A rubber composition for tire tread comprising a rubber mixture composed of the following components (a) to (d):

(a) 5 to 30% by weight of styrene-butadiene copolymer rubber, designated as SBR-A, having 35 to 60% by weight of bound styrene content and 35 to 60% by mole of vinyl bond in the butadiene unit and having a Mooney viscosity of 20 to 200 and a weight average molecular weight of 100000 to 1000000 wherein said SBR-A is prepared by solution polymerization in the presence of an organic lithium compound;

(b) 15 to 40% by weight of styrene-butadiene copolymer rubber, designated as SBR-B, having 5 to 20% by weight of bound styrene content and 50 to 90% by mole of vinyl bond in the butadiene unit, and having a Mooney viscosity of 20 to 200 and a weight average molecular weight of 100000 to 1000000 and prepared by solution polymerization in the presence of an organic lithium compound;

(c) 5 to 30% by weight of polybutadiene rubber, designated as BR, having 20% by mole or less of vinyl bond; and

(d) 10 to 60% by weight of natural rubber and/or synthetic polyisoprene rubber having 90% by mole or more of cis-1,4 bond.

4,929,680

PREPARATION METHOD OF MASTERBATCH COMPOSITION FOR THERMOPLASTIC RESIN MODIFICATION

Saburo Matsubara; Yoshihiro Gohshi; Seizo Kobayashi, and Katsumi Usui, all of Yokohama, Japan, assignors to Nippon Oil Co., Ltd., Tokyo, Japan

Filed Jun. 29, 1989, Ser. No. 373,009
Claims priority, application Japan, Jun. 30, 1988, 63-160706
Int. Cl.[5] C08L 23/18, 23/08
U.S. Cl. 525—240 10 Claims

1. A method for the preparation of a masterbatch composition for use in thermoplastic resin modification which comprises kneading and extruding a component mixture in the temperature range from the maximum peak temperature (Tm) to (Tm-45)° C in accordance with differential scanning calorimetry (DSC) of an ethylene-α-olefin copolymer, the component mixture comprising:

(A) 30–95 parts by weight of the ethylene-α-olefin copolymer obtained by copolymerizing ethylene with an α-olefin having 3–12 carbon atoms in the presence of a catalyst composed of an organic aluminum compound and a solid component containing at least magnesium and titanium, and characterized by the properties (I)–(IV):

(I) Melt index of from 0.01 to 100 g/10 min,

(II) Density of more than 0.910 g/cm^3 and 0.940 g/cm^3 or less

(III) Maximum peak temperature (Tm) of 100° C or more in accordance with differential scanning calorimetry (DSC), and

(IV) Boiling n-hexane insoluble matter of 10 wt % or more; and

(B) 5–70 parts by weight of polybutene having a number average molecular weight of 300–4000.

4,929,681

BLENDS OF LLDPE, POLYPROPYLENE AND AROMATIC POLYMERS AND HIGH MODULUS FILMS THEREOF

Surinder K. Bahl, Chandigarh, India; Peter J. Canterino, Towaco; Theresa L. Cunningham, Manalapan, both of N.J.; Susan P. Evans, Canandaigua, and Richard G. Shaw, Remsen, both of N.Y., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 61,596, Jun. 18, 1987, abandoned, which is a continuation of Ser. No. 814,716, Dec. 30, 1985, abandoned. This application Nov. 4, 1988, Ser. No. 267,471

Int. Cl.[5] C08L *23/20, 23/12, 25/06;* C08J *5/18*

U.S. Cl. 525—240 9 Claims

1. A film comprising a blend of:

75 to 90 weight percent of a linear low density copolymer of ethylene and an olefin having 4 to 10 carbon atoms (LLDPE) said linear low density copolymer having a density of less than 0.94;

1 to 20 weight percent of polypropylene (PP) or propylene-ethylene copolymer with a high propylene content; and

1 to 20 weight percent of a polymer of an aromatic monomer.

4,929,682

PROCESS FOR CRAFTING MALEIC ANHYDRIDE ON OLEFINIC POLYMERS

Viviano Banzi, and Roberto Fabri, both of Ferrara, Italy, assignors to Ausimont S.p.A., Milan, Italy

Continuation of Ser. No. 816,407, Jan. 6, 1986, abandoned. This application May 6, 1988, Ser. No. 191,809

Claims priority, application Italy, Jan. 8, 1985, 19048 A/85

Int. Cl.[5] C08F *255/04, 255/06, 291/02*

U.S. Cl. 525—257 7 Claims

1. Process for grafting maleic anhydride, alone or together with styrene, onto copolymers of ethylene with alpha-olefins of the formula, $R—CH=CH_2$, wherein $R=C_1-C_6$ alkyl, which comprises reacting said copolymers with an amount of maleic anhydride between 3 and 60% by weight with respect to the copolymer, in the presence of radical starters, at temperatures between 20° C. and 250° C., in a liquid medium consisting at least prevailingly of an aliphatic, cycloaliphatic or aromatic ketone containing from 3 to 22 carbon atoms, said copolymer being maintained in a state of suspension.

4,929,683

LIVING POLYMERIZATION OF OLEFIN TO END-FUNCTIONALIZED POLYMERS

Joseph P. Kennedy, and Munmaya K. Mishra, both of Akron, Ohio, assignors to University of Akron, Akron, Ohio

Division of Ser. No. 899,655, Aug. 25, 1986, abandoned. This application Mar. 28, 1988, Ser. No. 173,049

Int. Cl.[5] C08F *4/06, 297/08*

U.S. Cl. 525—268 18 Claims

1. A living polymer complex exhibiting supernonnucleophilic counter anions formed from olefinic monomer and a product formed at −10° C. and lower from a Lewis acid and a tertiary organic ether, said complex reacting to polymerize said monomer until said monomer is consumed or the complex is destroyed.

4,929,684

STIFF SIDEWALLS FOR PNEUMATIC TIRES

Charles M. Roland, Waldorf, Md.; Georg G. A. Bohm, and Steven E. Schonfeld, both of Akron, Ohio, assignors to Bridgestone/Firestone, Inc., Akron, Ohio

Filed Jun. 17, 1988, Ser. No. 207,845

Int. Cl.[5] C08K *5/09;* C08L *7/00, 9/00*

U.S. Cl. 525—274 6 Claims

1. A sidewall for the construction of pneumatic tires comprising a rubber selected from the group consisting of natural rubber, addition polymerized synthetic rubber and blends thereof and from about 20 to 80 parts of zinc dimethacrylate, per 100 parts of rubber, capable of providing a tensile modulus of elasticity of from about 30 to 200 MPa at 10 percent elongation.

4,929,685

METHOD FOR MODIFYING THE SURFACE OF POLYCARBONATE RESIN

Rikizo Kobashi; Shigeyuki Takase; Hiroyuki Enomoto; Yasushi Hayasaki, all of Nishinomiya; Toyohisa Kobayashi, Kawasaki, and Shingo Yamazaki, Nishinomiya, all of Japan, assignors to Nippon Oil and Fats Co., Ltd., Japan and PPG Industries, Inc., Pa.

Filed Jul. 11, 1988, Ser. No. 217,408

Claims priority, application Japan, Jun. 7, 1986, 61-132388; Jul. 15, 1987, 62-174777

Int. Cl.[5] C08F *263/00*

U.S. Cl. 525—277 4 Claims

1. A method for modifying the surface of a polycarbonate resin substrate, comprising the steps of:

providing a polycarbonate resin substrate, said polycarbonate resin comprising a copolymer of 50–99 wt % diethylene glycol bis(allyl carbonate), and 1–50 wt % of one member of monomers of glycidyl acrylate or glycidyl methacrylate, homopolymers thereof and copolymers thereof with a monomer copolymerizable therewith;

providing an amine, or solution thereof, having an active hydrogen atom, said amine, or solution thereof, being maintained at a temperature of about 50°–100° C.; and

immersing said polycarbonate resin substrate in said amine, or solution thereof, for about 1–180 minutes to react the glycidyl group present in the surface of the polycarbonate resin substrate with the amine.

4,929,686

FLUORINE-CONTAINING ELASTOMER COMPOSITION

Takehiro Sonoi, and Okimasa Yamada, both of Kitaibaraki, Japan, assignors to Nippon Mektron Ltd., Tokyo, Japan

Filed Feb. 23, 1989, Ser. No. 313,871

Claims priority, application Japan, May 23, 1988, 63-123766

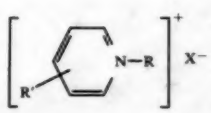
Int. Cl.[5] C08F *8/32*

U.S. Cl. 525—279 19 Claims

1. A fluorine-containing elastomer composition which comprises:

(a) 100 parts by weight of a fluorine-containing elastomer,

(b) 1 to 40 parts by weight of at least one of oxide and hydroxide of divalent metal, (c) 0.5 to 10 parts by weight of a polyhydroxyaromatic compound, and (d) 0.1 to 10 parts by weight of a quaternary ammonium salt compound represented by the following general formula [I]:



(I)

wherein R is an alkyl group having 1 to 24 carbon atoms or an aralkyl group having 7 to 20 carbon atoms, R' is a piperidino radical or a pyrrolidinyl radical, and X^- is an anion.

4,929,687

POLYMERS AND PROCESS OF MAKING SAME

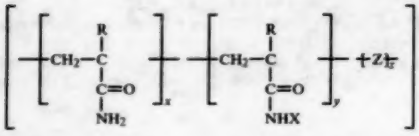
Peter A. Jarovitzky, Stamford; Yun-Lung Fu, Milford, and Robin W. Dexter, Wilton, all of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed May 5, 1986, Ser. No. 859,681

Int. Cl.[5] C08F *8/22*

U.S. Cl. 525—328.2 8 Claims

1. A water-soluble polymer comprising recurring units of the formula:



wherein R is hydrogen or methyl, X is a halogen atom, the ratio of x to y ranges from about 99.9:0.1 to about 50:50, respectively, the ratio of (x plus y) to z ranges from about 99.9 to 0.1 to about 50:50, respectively, and Z is the residue of a copolymerized cationic monomer, the molecular weight of the polymer being at least about 100,000.

4,929,688

CURE SYSTEM FOR OPEN STEAM CURING OF MINERAL-LOADED CHLOROBUTYL COMPOUNDS

Terry F. Allen, and Robert C. Schisler, both of Akron, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 231,288, Aug. 11, 1988, Pat. No. 4,873,290. This application Jul. 3, 1989, Ser. No. 374,807

Int. Cl.[5] C08C *19/26*

U.S. Cl. 525—332.5 10 Claims

1. A vulcanizable composition comprising a blend of chlorobutyl rubber with (1) 25 to about 200 phr of a filler selected from the group consisting of calcium carbonate, magnesium carbonate, magnesium silicate, calcium silicate, aluminum silicate, whiting, pyrogenic silica, hydrated silica, barium sulfate, calcium sulfate, titanium dioxide and mica and (2) a vulcanization agent comprising from about 0.25 to about 10 phr of an alkyl phenol disulfide and from about 0.25 to about 10 phr of a guanidine compound selected from the group consisting of diphenyl guanidine, di-ortho-tolylguanidine, triphenyl guanidine and di-ortho-tolylguanidine salt of dicatechol borate.

4,929,689

POLYOLEFINECARBOXYLIC ACIDS, THEIR PREPARATION AND THEIR USE FOR PREPARING POLYOLEFINE-POLYCARBONATE BLOCK COPOLYMERS

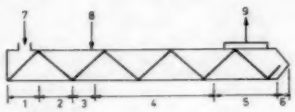
Kurt P. Meurer; Helmut Waniczek, both of Cologne; Gerd Sylvester, Leverkusen, and Josef Witte, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Division of Ser. No. 50,165, May 14, 1987, Pat. No. 4,798,873. This application Sep. 27, 1988, Ser. No. 250,014

Claims priority, application Fed. Rep. of Germany, May 31, 1986, 3618378

Int. Cl.[5] C08F *200/00*

U.S. Cl. 525—333.9 7 Claims



1. A poly-(C_2–C_{10}-α-olefine)-carbonyl halide having molecular weights $\overline{M}_w$ of 2000 to 235,000.

4,929,690

PREPARATION OF METAL SALTS OF CARBOXYL-CONTAINING POLYMERS

Hans-Helmut Goertz, Freinsheim; Walter Denzinger, Speyer, and Hans-Juergen Raubenheimer, Ketsch, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Oct. 28, 1988, Ser. No. 264,021

Claims priority, application Fed. Rep. of Germany, Oct. 31, 1987, 3736997

Int. Cl.[5] C08F *8/42*

U.S. Cl. 525—366 9 Claims

1. A process for preparing a metal salt of a carboxyl-containing polymer, comprising the steps of:

reacting a carboxyl- and/or carboxylic anhydride group-containing polymer suspended in an inert solvent in which the polymer and its metal salt are insoluble with a pulverulent basic metal compound;

drying the resulting suspension of polymeric metal salt;

adding water to the suspension of the polymeric metal salt; and

removing the solvent by distillation.

4,929,691

LIQUID SILICONE RESIN COMPOSITIONS

Danielle M. Fillmore, Midland, County, Mich.; John G. Price, South Glamorgan, United Kingdom, and Terence J. Swihart, Bay County, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Mar. 28, 1989, Ser. No. 329,911

Int. Cl.[5] C08F *283/00*

U.S. Cl. 525—477 24 Claims

1. A liquid silicone resin composition prepared by a process comprising:

(I) reacting a mixture consisting essentially of

(A) a polydimethylsiloxane,

(B) a methyltrialkoxysilane having the formula $MeSi(OR)_3$, wherein Me denotes a methyl radical and R is an alkyl radical having from 1 to 3 carbon atoms, and

(C) an equilibrating amount of an acid catalyst having the formula

$$R'SO_3H$$

wherein R' is a perfluoroalkyl group having 1 to 10 carbon atoms, the molar ratio of said methyltrialkoxysilane (B) to

said polydimethylsiloxane (A) being between about 1:1 and about 10:1;

(II) hydrolyzing the reaction product formed in step (I) with sufficient water to provide from about 0.48 to about 0.81 mole of residual alkoxy functionality per 100 parts by weight of said liquid silicone resin; and

(III) neutralizing said acid catalyst (C).

4,929,692

CROSSLINKED COPOLYMERS AND OPHTHALMIC DEVICES MADE FROM VINYLIC MACROMERS CONTAINING PERFLUOROPOLYALKYL ETHER AND POLYALKYL ETHER SEGMENTS AND MINOR AMOUNTS OF VINYLIC COMONOMERS

Merrill Goldenberg, Teaneck, N.J., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jan. 11, 1989, Ser. No. 296,169

Int. Cl.[5] **C08F** *16/24, 18/20*

U.S. Cl. 526—247 **16 Claims**

1. A crosslinked polymer which is the addition polymerization product of (a) a macromer containing perfluoropolyalkylether and polyalkylether segments and ethylenically unsaturated moieties, having the formula I, more specifically as seen in formulas Ia to Id,

$$E—T—L—Q—X—Z—X—Q—L—T—E, \quad (Ia)$$

$$E—T—L—Q—X—Z—X—Q—L, \quad (Ib)$$

$$E—T—L—Q—X—G—X—Q—L—T—E, \text{ or} \quad (Ic)$$

$$E—T—L—Q—X—G—X—Q—L \quad (Id)$$

wherein

Z is $—(C_aF_{2a}O)_b—CF_2—$, where

a is 1 to 4, b is 2 to 200;

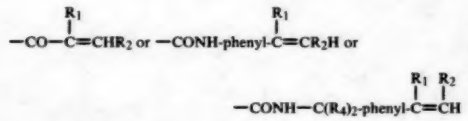
X is a direct bond, $—CH_2—$, $—CH_2OCH_2CHOHCH_2—$, $—CH_2(OCH_2CH_2)_y—$ or carbonyl where y is 1 to 10 and where in each case the carbon atom is attached to Z or G;

Q is a direct bond or —ACONH—R—NHCO— where A is oxa or imino and R is a divalent aliphatic group having from 2 to 14 carbon atoms, a divalent 5- or 6-membered cycloaliphatic group having 5 to 14 carbon atoms or an arylene group having 6 to 14 carbon atoms;

L is $—A(C_mH_{2m}O)_nC_mH_{2m}AY—$ or L_1 where Y is a direct bond or H and m is 2 to 4 or mixtures thereof and n is 5 to 100, where A is attached to Q;

T is —CONH—R_5A— or —CONH—R—NHCOOR_5A— or —CONH—R—NHCO—A— or —R_5A— or direct bond where the carbonyl group is attached to L, where R_5 is alkylene or hydroxy-substituted alkylene of 2 to 15 carbon atoms and R is as above;

E is



where

R_1 is hydrogen or methyl, and

R_2 is hydrogen, methyl or —$COOR_3$

where

R_3 is hydrogen or alkyl of 1 to 4 carbon atoms with the proviso that, when R_1 is methyl, R_2 is hydrogen, R_4 is hydrogen or methyl and G is $—(C_aF_{2a}O)_b—CF_2[CH_2—OCONH—R—NHCOOCH_2CF_2(OC_aF_{2a})_b]_x$ or $—(C_aF_{2a}O)_b—CF_2[CH_2—NHCONH—R—NHCONHCH_2CF_2(OC_aF_{2a})_b]_x$

where

x is 1 to 3;

L_1 is $—A(C_mH_{2m}O)_n[C_mH_{2m}ACONH—R—NHCOA(C_mH_{2m}O)_{n1}]_zC_mH_{2m}AY$

where n_1 is 5 to 100, z is 1 to 10 and Y is a direct bond or H; and (b) a vinylic comonomer selected from

(i) hydrophilic monomers selected from hydroxy-substituted lower alkyl acrylates and methacrylates, acrylamide, methacrylamide, C_1–C_2 lower alkyl acrylamide and methacrylamide, ethoxylated acrylates and methacrylates, hydroxy substituted lower alkyl acrylamide and methacrylamide, hydroxy substituted lower alkyl vinyl ethers, sodium ethylene sulfonate, sodium styrenesulfonate, 2-acrylamido-2-methylpropanesulfonic acid, N-vinylpyrrole, N-vinylsuccinimide, N-vinylpyrrolidone, 2- and 4-vinylpyridine, acrylic acid, methacrylic acid, amino (by amino including quaternary ammonium),-monoloweralkylamino- or diloweralkylamino- lower alkyl acrylates or methacrylates and allyl alcohol;

(ii) hydrophobic monomers selected from

C_1 to C_{18} alkyl acrylates and methacrylate, C_3 to C_{18} alkyl acrylamides and methacrylamides, acrylonitrile, methacrylonitrile, vinyl C_1 to C_{18} alkanoates, C_2 to C_{18} alkenes, C_2 to C_{18} haloalkenes, styrene, C_1 to C_6 alkyl styrenes, vinyl alkyl ethers wherein the alkyl portion has 1 to 6 carbon atoms, C_3–C_{12} perfluoroalkyl ethyl thiocarbonylaminoethyl acrylates and methacrylates, C_3–C_{12} fluoroalkyl acrylates and methacrylates, acryloxy and methacryloxy-alkyl-siloxanes, N-vinylcarbazole, C_1–C_{12} alkyl esters of maleic, fumaric, itaconic, and mesaconic acids;

(iii) polyreactive crosslinking agents such as allyl methacrylate, diallyl itaconate, monoallyl itaconate, diallyl maleate, diallyl fumarate, diallyl succinate, diallyl phthalate, triallyl cyanurate, triallyl isocyanurate, diethylene glycol bis-allyl carbonate, triallyl phosphate, triallyl trimellitate, allyl ether, N,N-diallylmelamine; vinyl compounds, e.g. divinyl benzene, N,N'-methylene-bis-acrylamide, ethylene glycol dimethacrylate, neopentylglycol dimethacrylate, tetraethylene glycol dimethacrylate, hexamethylene-bis-maleimide, divinyl urea, bisphenol A bis methacrylate, divinyl adipate, glycerin trimethacrylate, trimethylolpropane triacrylate, trivinyl trimellitate, 1,5-pentadiene, 1,3-bis(4-methacryloxybutyl) tetramethyl disiloxane, divinyl ether, and divinyl sulfone; and the dimethacrylate formed by reacting perfluoropolyalkylether dimethanol or poly-(ethylene glycol) with two moles of isocyanatoethyl methacrylate; and

(iv) mixtures of (i), (ii) and (iii).

4,929,693

PHOTOCHROMIC COMPOUND

Ryojiro Akashi, Otsu, and Takashi Taniguchi, Yasu, both of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed Feb. 2, 1988, Ser. No. 151,601

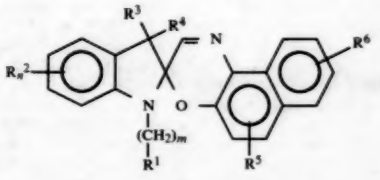
Claims priority, application Japan, Feb. 2, 1987, 62-20379; Feb. 13, 1987, 62-29703; Apr. 9, 1987, 62-87607; Jun. 9, 1987, 62-144461; Aug. 17, 1987, 62-204574; Dec. 8, 1987, 62-311635; Dec. 22, 1987, 62-326498

Int. Cl.[5] **C08F** *26/06*

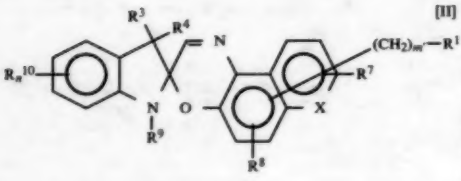
U.S. Cl. 526—259 **22 Claims**

1. A photochromic polymer comprising a photochromic spirooxazine compound of the formula:

[I]

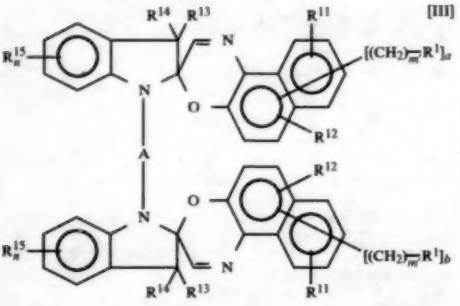


wherein R^1 represents an addition polymerizable or a ring-opening polymerizable organic functional group; R^2, R^5 and R^6 are the same or different, and represent a hydroxyl group, amino group, organic substituted amino group, C_1–C_6 alkoxyl group, C_1C_{20} alkyl group, halogen, carboxyl group, C_2–C_{10} acyl group, nitro group or hydrogen; R^3 and R^4 are the same or different, and represent a C_1–C_{10} alkyl group, C_7–C_{12} aralkyl group, or R^3 and R^4 cooperatively represent a C_6–C_8 alicyclic ring with a spiro carbon atom, norbornyl group or adamantyl group; m is an integer of 1–30; and n is an integer of 0–4,



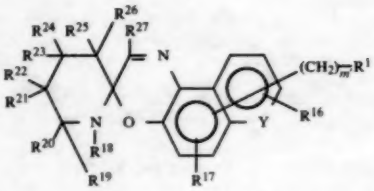
[II]

wherein R^1 has the same as in formula; [I]; R^7, R^8 and R^{10} are the same or different, and represent an organic substituted amino group, C_1–C_6 alkoxy group, C_1–C_{20} alkyl group, halogen, carboxyl group, C_2–C_{10} acyl group, nitro group or hydrogen; R_9 represents C_1–C_{30} alkyl group, phenyl group, substituted phenyl group, C_7–C_{12} aralkyl group, C_7–C_{12} substituted aralkyl group, C_1–C_{30} hydroxyalkyl group, C_1–C_{30} aminoalkyl group, C_4–C_{30} acryloxyalkyl group, C_4–C_{30} acrylamidoalkyl group, C_5–C_{30} metacryloxyalkyl group or C_5–C_{30} methacrylamidoalkyl group; R^3 and R^4 have the same meaning as R^3 and R^4 in formula; X represents N or CH; m' represents an integer of 0-10; and n has the same meaning as in formula, with the proviso that when X is nitrogen, the $(CH_2)_{m'}$-R^1 group does not bond to this nitrogen atom,



[III]

wherein R^1 has the same meaning as in formula; R^{11}, R^{12} and R^{15} are the same or different, and represent an organic substituted amino group, C_1–C_6 alkoxy group, C_1–C_{20} alkyl group, halogen, carboxyl group, C_2–C_{10} acyl group, hydroxyl group, nitro group, C_1–C_{10} hydroxyalkyl group or hydrogen; R^{13} and R^{14} are the same or different, and represent a C_1–C_{10} alkyl group, aryl group, C_7–C_{12} aralkyl group, or R^{13} and R^{14} cooperatively represent a C_6–C_8 alicyclic ring with a spiro carbon atom, norbornyl group or adamantyl group; A represents a C_1–C_{30} alkylene group, C_1–C_{30} alkylene(poly)oxyalkylene group, or C_8–C_{20} alkylenearylalkylene group; a and b are the same or different, and are 0 or 1 and (a+b) is 1 or 2; m' and n have the same meaning as in formula, [II], respectively or



[IV]

wherein R^1 has the same meaning as in formula; R^{16} and R^{17} are the same or different, and represent an organic amino group, C_1–C_6 alkoxyl group, C_1–C_{20} alkyl group, halogen, carboxyl group, C_2–C_{10} acyl group, cyano group, nitro group or hydrogen; R^{18} is a C_1–C_{30} alkyl group, phenyl group, substituted phenyl group, C_7–C_{12} aralkyl group or C_7–C_{12} substituted aralkyl group; R^{19} to R^{26} are the same or different and represent a C_1–C_{30} alkyl group, phenyl group, substituted phenyl group, C_7–C_{12} aralkyl group, C_7–C_{12} substituted aralkyl group, C_1–C_6 alkoxyl group, carboxyl group, nitro group or hydrogen; R^{27} represents a C_1–C_{30} alkyl group, phenyl group, substituted phenyl group, C_7–C_{12} aralkyl group, C_7–C_{12} substituted aralkyl group, C_1–C_6 alkoxy group, carboxyl group, or hydrogen; Y represents N or C—R^{16} (wherein R^{16} has the same meaning as mentioned above); and m' has the same meaning as in formula, with the proviso that when Y is nitrogen, the —$(CH_2)_{m'}$-R^1 group does not bond to this nitrogen atom,

said photochromic polymer is prepared by polymerization of said photochromic spirooxazine compound, wherein the polymerization occurs through R^1 of each of formulae [I], [II], [III] and [IV].

4,929,694

COPOLYMERS OF P-MERCAPTOSTYRENE AND ITS ESTERS

Mohammad Aslam, Corpus Christi, Tex.; Richard Vicari, Chatham Township, and Kenneth G. Davenport, Basking Ridge, both of N.J., assignors to Hoechst Celanese Corporation, North Somerville, N.J.

Filed May 4, 1989, Ser. No. 348,337

Int. Cl.[5] C08F *228/02*

U.S. Cl. 526—262 **6 Claims**

1. Copolymers of a p-mercaptostyrene ester where in ester group is derived from a carboxylic acid containing 2 to 4 carbon atoms, with at least one comonomer selected from the group consisting of styrene, N-methylmaleimide, maleic anhydride and p-acetoxystyrene.

4,929,695

WATER TREATMENT POLYMERS AND METHODS OF USE THEREOF

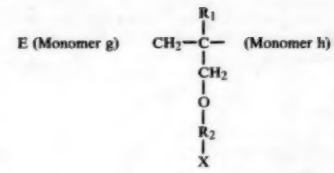
Fu Chen, Newtown, and William S. Carey, Ridley Park, both of Pa., assignors to Betz Laboratories, Inc., Trevose, Pa.

Division of Ser. No. 215,105, Jul. 5, 1988, Pat. No. 4,895,916, which is a continuation-in-part of Ser. No. 37,484, Apr. 13, 1987, Pat. No. 4,759,851, which is a continuation of Ser. No. 864,049, May 16, 1986, Pat. No. 4,659,481, which is a continuation of Ser. No. 545,563, Oct. 26, 1983, abandoned. This application Oct. 27, 1989, Ser. No. 428,813

Int. Cl.[5] C08F *20/42*

U.S. Cl. 526—297 **7 Claims**

1. Composition of a water soluble polymer comprising substantially repeat units having the structure:



wherein E in the above formula is the repeat unit obtained after polymerization of an ethylenically unsaturated compound or compounds; wherein R_1 is hydrogen or lower alkyl (C_1–C_3); R_2 is a hydroxy substituted lower alkylene group having from 1 to 6 carbon atoms or a non-substituted lower alkylene group having from 1 to 6carbon atoms; X is selected from the group consisting of CN and $CONR_3R_4$; wherein R_3 and R_4 is independently hydrogen or lower alkyl (C_1–C_3); the molar ration g:h of said polymer being between about 30:1 to 1:20.

4,929,696

BISACRYLATE MONOMERS AND POLYMERS EXHIBITING NONLINEAR OPTICAL RESPONSE

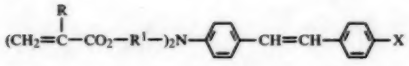
Ronald N. DeMartino, Wayne; Anthony J. East, Madison, and Gordon W. Calundann, North Plainfield, all of N.J., assignors to Hoechst Celanese Corp., Somerville, N.J.

Division of Ser. No. 135,764, Dec. 21, 1987. This application Nov. 13, 1989, Ser. No. 434,260

Int. Cl.[5] C07C *69/52*

U.S. Cl. 526—312 **11 Claims**

1. A process for producing a thermoset polymer product which comprises polymerizing a monomer corresponding to the formula:



where R is a C_1–C_4 alkyl substituent, R^1 is a divalent C_2–C_{12} alkylene radical, and X is $—NO_2$, —CN or $—CF_3$.

4,929,697

USE OF ESTER GROUP CONTAINING POLYOLS IN A RIM PROCESS

Neil H. Nodelman, Pittsburgh, Pa., assignor to Mobay Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 83,558, Aug. 7, 1987, abandoned. This application Jan. 27, 1989, Ser. No. 302,654

Int. Cl.[5] C08G *18/32, 18/38*

U.S. Cl. 528—77 **3 Claims**

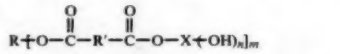
1. In a process for the production of polyurethane moldings by reacting a reaction mixture comprising

(a) a polyisocyanate,

(b) an isocyanate-reactive material having a molecular weight of from about 840 to about 5,000, and

(c) a chain extender, said reaction mixture being processed as a one-shot system by the RIM process at an isocyanate index of from about 70 to about 130,

the improvement wherein component (b) comprises a polyester polyol having the structure



wherein

R represents the residue of a polyepoxide after ring opening with a carboxylic acid group,

R′ represents the residue of a cyclic anhydride,

X represents the organic residue of a polyol,

m represents the number of epoxy groups of the polyepoxide ring opened with carboxylic acid groups, and

n is an integer of from 1 to 7.

4,929,698

NEW POLYESTER YARNS HAVING PLEASING AESTHETICS

John F. Hagewood, Mathews, N.C., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 207,077, Jun. 14, 1988, abandoned, Continuation-in-part of Ser. No. 53,308, May 22, 1987, abandoned. This application Mar. 3, 1989, Ser. No. 318,798

Int. Cl.[5] C08G *63/02*

U.S. Cl. 528—272 **4 Claims**

1. An interlaced multifilament draw-warping feed yarn consisting essentially of spin-oriented poly[ethylene terephthalate/5-sodium-sulfo-isophthalate] copolyester filaments containing about 2 mole % of ethylene 5-sodium-sulfo-isophthalate repeat units, being of denier about 40 to about 300, having an average interlace level of about 5.5 to about 9.5 RPC, and being provided with a finish that is stable enough to persist on such yarn after draw-warping in sufficient quantity and in such condition as to provide finish to enhance knitting performance.

4,929,699

PROCESS FOR HYDROGENATION OF POLYMERS

David R. Wilson, and James C. Stevens, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 9, 1989, Ser. No. 349,549

Int. Cl.[5] C08F *8/04*

U.S. Cl. 525—339 **11 Claims**

1. A process for hydrogenation of a polymer containing ethylenic unsaturation comprising contacting the polymer with a bis(alkyl substituted cyclopentadienyl) lanthanide-based compound and a hydrogenating agent under hydrogenation conditions.

4,929,700

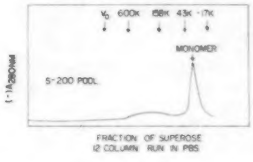
PRODUCTION OF PURIFIED, BIOLOGICALLY ACTIVE, BACTERIALLY PRODUCED RECOMBINANT HUMAN CSF-1

Robert Halenbeck, San Rafael; Kriston Koths, El Cerrito; Cynthia Cowgill, Berkeley, and Walter J. Laird, Pinole, all of Calif., assignors to Cetus Corporation, Emeryville, Calif.

Continuation-in-part of Ser. No. 114,001, Oct. 27, 1987, abandoned, which is a continuation-in-part of Ser. No. 40,174, Apr. 16, 1987, abandoned. This application Apr. 8, 1988, Ser. No. 173,428

Int. Cl.[5] C07K *3/28*

U.S. Cl. 530—351 **41 Claims**



1. A method to obtain purified, biologically active CSF-1 dimer from the product of a CSF-1 gene recombinantly expressed in bacteria, which method comprises:

(a) recovering in a chaotropic environment and under reducing conditions, the reduced monomeric, solubilized form of said CSF-1 product from bacterial cells;

(b) refolding, including formation of CSF-1 dimer, the monomer of (a) under refolding conditions; and
(c) purifying the refolded, dimerized CSF-1 of (b).

4,929,701

HYDROGENATION OF CO/OLEFIN COPOLYMER

Johannes A. M. van Broekhoven, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Mar. 20, 1989, Ser. No. 325,793
Claims priority, application Netherlands, Mar. 21, 1988, 8800699
Int. Cl.[5] C08G 67/02
U.S. Cl. 525—539 11 Claims

1. A process for producing a linear alternating polymer product wherein two-carbon monomeric units, optionally containing a methyl substituent, alternate with 2,5-tetrahydrofurandiyl units optionally containing a methyl substituent on one of the carbon atoms in the 3 or 4 positions which comprises hydrogenating under hydrogenation conditions a linear reactant linear alternating polymer of carbon monoxide and at least one α-olefin, in an inert reaction diluent, in the presence of a catalyst formed from a ruthenium carbonyl and an organic iodide.

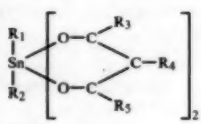
4,929,702

TIN MONOCHELATE CATALYSIS OF ORGANOPOLYSILOXANE COMPOSITIONS

Jacques Cavezzan; Jean-Marc Frances, both of Villeurbanne, and Pierre Lancelin, Marcy l'Etoile, all of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed Jun. 27, 1988, Ser. No. 211,897
Claims priority, application France, Jun. 25, 1987, 87 09179
Int. Cl.[5] C08G 77/06
U.S. Cl. 528—18 6 Claims

1. An organopolysiloxane composition of matter curable into elastomeric state, comprising (1) a curable organopolysiloxane base which is an organopolysiloxane polymer and a crosslinking agent therefor, and (2) a catalytically effective amount of the product of reaction between (a) a diorganotin bischelate of the formula:



(1)

in which:
the symbols R_1 and R_2, which may be identical or different, are each an optionally substituted, monovalent C_1–C_{18} hydrocarbon radical;
the symbols R_3 and R_5, which may be identical or different, are each one of the radicals R_1 or R_2, a hydrogen atom, C_1–C_5 alkoxy radical or an $Si(R_1)_3$ silyl radical; and
the symbol R_4 is a hydrogen atom, or an optionally halogenated C_1–C_8 hydrocarbon radical, with the proviso that R_4 and R_5 may together form, with the carbon atoms from which they depend, a divalent C_5–C_{12} cyclic hydrocarbon radical, or an optionally substituted such cyclic radical bearing at least one chloro, nitro and/or cyano substituent, with (b) an organic acid of the formula:

XH (2)

in which X is a radical of the formula R_6COO wherein R_6 has the same definition as R_1, in a molar ratio (1)/(2) ranging from 0.01 to 100 said product of reaction being a monochelate of pentacoordinated tin of valency IV.

4,929,703

SOLVENTLESS SILICONE COATING COMPOSITION

Dipak B. Narula; Anh Be, both of Midland County, and Terence J. Swihart, Bay County, all of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Mar. 30, 1989, Ser. No. 330,540
Int. Cl.[5] C08G 77/06
U.S. Cl. 528—23 22 Claims

1. A composition comprising:
(A) 100 parts by weight of a liquid silicone resin prepared by a process comprising
(I) reacting a mixture consisting essentially of
(i) a first silane having the average general formula

$$R^1_aSi(OR)_{4-a}$$

wherein R is selected from the group consisting of methyl, ethyl, propyl and acetyl radicals, R^1 is a monovalent hydrocarbyl group selected from the group consisting of phenyl and alkyl radicals having 1 to 3 carbon atoms and a is 1 to 2,
(ii) a first diorganopolysiloxane, having organic groups independently selected from the group consisting of phenyl, vinyl, alkyl radicals having 1 to 4 carbon atoms and halogenated alkyl radicals having 1 to 4 carbon atoms and
(iii) an equilibrating amount of an acid catalyst having the formula

$$ZSO_3H$$

wherein Z is a perfluoroalkyl group having 1 to about 10 carbon atoms, the molar ratio of said silane (i) to said diorganopolysiloxane (ii) being between about 1:1 and about 10:1,
(II) hydrolyzing the reaction product formed in step (I) with sufficient water to provide from about 0.5 to about 1 mole of residual —OR functionality per 100 parts by weight of said liquid silicone resin and
(III) neutralizing said acid catalyst (iii);
(B) from about 1 to 100 parts by weight of a second silane having the general formula

$$R^3Si(OR)_3$$

wherein R^3 is selected from the group consisting of phenyl vinyl, alkyl radicals having 1 to 4 carbon atoms and halogenated alkyl radicals having 1 to 4 carbon atoms and R has the definition set forth in (A)(I)(i) above; and
(C) from about 1 to 200 parts by weight of a second diorganopolysiloxane having the average formula

$$R^4O(R^5R^6SiO)_yR^4$$

wherein y is about 3 to 10, R^4 is selected from the group consisting of hydrogen and the above defined R groups and R^5 and R^6 are selected from the group consisting of phenyl, vinyl, alkyl radicals having 1 to 4 carbon atoms and halogenated alkyl radicals having 1 to 4 carbon atoms.

4,929,704

ISOCYANATE- AND ISOTHIOCYANATE-MODIFIED POLYSILAZANE CERAMIC PRECURSORS

Joanne M. Schwark, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Dec. 20, 1988, Ser. No. 286,839
Int. Cl.[5] C08G 77/04
U.S. Cl. 528—28 8 Claims

1. A process for preparing a partially cross-linked polysilazane addition polymer comprising
(1) preparing a silazane ammonolysis product by reacting ammonia with a halogenated silicon compound selected from the group consisting of $RSiX_3$, $RR'SiX_2$ and mixtures thereof, wherein X is selected from the group consisting of Cl, Br and I; and R and R' are the same or

different and are selected from the group consisting of H, substituted or unsubstituted 1–6 carbon alkyl, aryl, 1–6 carbon alkenyl and 1–6 carbon alkynyl groups, at least one of the halogenated silicon compounds containing a Si-H bond,

(2) reacting the silazane ammonolysis product with from about 0.1% to about 30% by weight, based on the weight of the ammonolysis product, of a compound selected from the group consisting of isocyanates, isothiocyanates, ketenes, thioketenes, carbodiimides and carbon disulfide to form a polysilazane addition polymer, and

(3) heating to a temperature not exceeding 300° C. for a time sufficient to partially cross-link the addition polymer and increase the viscosity to a value suitable for the desired end use of the polymer.

4,929,705

NEW POLYISOCYANATE-POLYADDITION COMPOUNDS, A PROCESS FOR THEIR PREPARATION AND THEIR USE FOR THE DISPERSION OF SOLIDS

Jan Mazanek, Cologne; Ulrich von Gizycki, Leverkusen; Hanns P. Müller, Bergisch-Gladbach; Martin Wienkenhöver; Karl-Heinz Wieser, both of Leverkusen; Volker Paulat, Monheim; Werner Theuer, and Walter Müller, both of Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Mar. 28, 1989, Ser. No. 329,462

Claims priority, application Fed. Rep. of Germany, Mar. 30, 1988, 3810781

Int. Cl.[5] C08G *18/30*

U.S. Cl. 528—49 **26 Claims**

1. Polyisocyanate-polyaddition compounds which are obtainable by the reaction of polyisocyanates containing from 3 to 8 isocyanate groups per molecule with

(A) from 5 to 60 equivalents % (based on the isocyanate groups of the polyisocyanates put into the process) of one or more compounds selected from the group represented by the following formulae:

$$R_1—(—AO—)_x—X \quad (I)$$

and

$$R_1—R_2—X \quad (II)$$

wherein

R_1 denotes an aliphatic group containing 1 to 60 carbon atoms, an aromatic or an araliphatic group containing 6 to 60 carbon atoms or the residue of a carboxylic acid, a carboxylic acid derivative or a sulphonamide containing from 1 to 60 carbon atoms,

AO denotes an alkylene oxide group containing from 2 to 22 carbon atoms,

x stands for a number from 0 to 200,

X denotes a HO, HS, H_2N or HRN group in which R=C_1 to C_6 alkyl, and

R_2 denotes an aliphatic polyester group having a molecular weight in the range of from 200 to 10,000 and

(B) from 20 to 80 equivalents % (based on the isocyanate groups of the polyisocyanates put into the process) of a tertiary amine which has from 3 to 20 carbon atoms and in addition contains a HO, HS, H_2N or HRN group in which R=C_1 to C_6 alkyl, the sum of (A)+(B) amounting to 40 to 98 equivalents % (based on the isocyanate groups of the polyisocyanates put into the process).

4,929,706

CELL GROWTH ENHANCERS AND/OR ANTIBODY PRODUCTION STIMULATORS COMPRISING CHEMICALLY MODIFIED HYDROPHILIC POLYUREA-URETHANE PREPOLYMERS AND POLYMERS

Aaron H. Heifetz, Columbia, Md.; Richard A. Wolfe, Ellisville, Mo.; James A. Braatz, Beltsville, and Narender P. Luthra, Columbia, both of Md., assignors to W. R. Grace & Co.-Conn., New York, N.Y.

Continuation-in-part of Ser. No. 266,445, Nov. 2, 1988. This application Mar. 3, 1989, Ser. No. 319,458

Int. Cl.[5] C08G *18/10*

U.S. Cl. 528—49 **60 Claims**

1. A modified hydrophilic polymer comprising oxyethylene-based diols or polyol units on which at least some of the hydroxy groups have been capped with polyisocyanate wherein the isocyanates of said polyisocyanates have been modified by an isocyanate (NCO) reactive functional group and wherein said modified polymer expresses a free functional group, said isocyanates being modified to the extent that said modified polymer effectively enhances mammalian cell growth and/or stimulates antibody production.

4,929,707

POLYURETHANE BASE LENS RESIN, PLASTIC LENS COMPRISING THE RESIN AND PREPARATION METHOD OF THE LENS

Teruyuki Nagata; Koju Okazaki, both of Fukuoka; Nobuyuki Kajimoto, Kanagawa; Tohru Miura, Kanagawa; Yoshinobu Kanemura, Kanagawa, and Katsuyoshi Sasagawa, Kanagawa, all of Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

Filed Feb. 3, 1989, Ser. No. 305,905

Claims priority, application Japan, Feb. 16, 1988, 63-31788; Feb. 22, 1988, 63-37514

Int. Cl.[5] C08G *18/38*

U.S. Cl. 528—76 **27 Claims**

1. A polyurethane base resin comprising reacting one or more of sulfur-containing polyisocyanate compounds with one or .nore of sulfur-containing polyol compounds.

4,929,708

EPOXY RESIN COMPOSITIONS

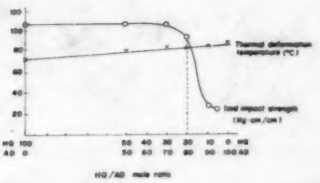
Kaoru Tominaga, and Tadao Iwata, both of Chiba, Japan, assignors to Mitsui Sekiyu Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 26, 1986, Ser. No. 935,303

Claims priority, application Japan, Nov. 26, 1985, 60-263904; Dec. 27, 1985, 60-292594

Int. Cl.[5] C08G *59/22, 59/50*

U.S. Cl. 528—118 **6 Claims**



1. A liquid epoxy resin composition comprising 1,1-bis (4-hydroxyphenyl ethane diglycidylether and an aminoalkyl piperazine compound selected from N-aminoalkyl piperazines in which the alkyl group has from 1 to 6 carbon atoms and N,N'-bis (aminoalkyl) piperazines in which the alkyl groups have from 1 to 6 carbons atoms, wherein the equivalent weight ratio of the epoxy groups in the composition to the active

hydrogen of the aminoalkyl piperazine compound is from 0.8 to 1.2.

4,929,709

POLYCARBONATE CONTAINING ARALKYLPHENYL END GROUPS

Ralf Dujardin; Rolf-Volker Meyer, both of Krefeld, and Wolfgang Siebourg, Bonn, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany

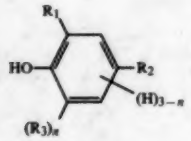
Filed Jan. 25, 1989, Ser. No. 301,690

Claims priority, application Fed. Rep. of Germany, Feb. 10, 1988, 3803939

Int. Cl.[5] C08G *63/62*

U.S. Cl. 528—198 **7 Claims**

1. Thermoplastic, aromatic polycarbonate having a number average molecular weights $\overline{M}_n$ (number average determined by gel chromatography after calibration) of at least 5000 g/mol based on diphenols, chain terminating agents and optionally branching agents, characterised in that the chain terminating agent correspond to formula (I)



(I)

where R_1, R_2 and R_3 are identical or different and stand for C_2–C_{12}-alkyl or C_8–C_{20}-aralkyl, at least one of the groups R_1 or R_2 being a C_8–C_{20}-aralkyl group and "n" having a value of from 0.5 to 1.

4,929,710

HYDROXYCARBOXYLIC ACID/UNSATURATED AROMATIC HYDROCARBON RESIN USEFUL AS RECORDING MATERIAL

Thomas Scholl, Meerbusch; Gert Jabs, Odenthal, both of Fed. Rep. of Germany, and Adolf Richartz, Apapa, Nigeria, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

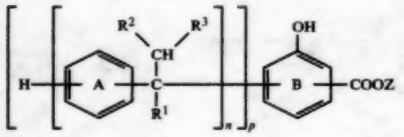
Filed Oct. 7, 1987, Ser. No. 105,799

Claims priority, application Fed. Rep. of Germany, Oct. 21, 1986, 3635742

Int. Cl.[5] C08G *83/00*

U.S. Cl. 528—205 **6 Claims**

1. A compound of the following formula (I)



(I)

wherein the rings A and B are unsubstituted or substituted and wherein

R^1 to R^3 independently of one another denote H or alkyl or together with at least 2 C atoms of ring A denote the remainder to complete a ring,

Z denotes M/m

M denotes an m-valent metal ion,

m denotes a whole number,

n denotes a whole, at least 2 and

p denotes a whole number from 1 to 3.

4,929,711

PROCESS FOR CONVERTING POLYKETONES TO POLYESTERS

Biau-Hung Chang, West Chester; Lester Y. Lee, Hamilton, and Jack Kwiatek, Cincinnati, all of Ohio, assignors to Quantum Chemical Corporation, New York, N.Y.

Filed Oct. 4, 1989, Ser. No. 416,903

Int. Cl.[5] C08G *2/06*

U.S. Cl. 528—220 **16 Claims**

1. A process for converting polyketones to polyesters which comprises contacting a polyketone of molecular weight greater than 1,000 and having a carbonyl content from 0.01% to 50% by weight with an organic peroxyacid oxidizing agent having from 2 to 30 carbon atoms in an inert liquid medium at a temperature from −20° C. to 150° C.; the molar ratio of said oxidizing agent to carbonyl ranging from 0.1:1 to 30:1 and the weight ratio of said inert liquid medium to said polyketone ranging from 1:1 to 100:1.

4,929,712

POLYACETAL RESIN COMPOSITION

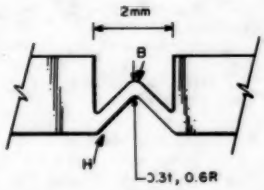
Noriyuki Sugiyama, Shizuoka, and Mitsuhiro Mochizuki, Fuji, both of Japan, assignors to Polyplastics Co., Ltd., Osaka, Japan

Filed Jun. 26, 1989, Ser. No. 371,067

Claims priority, application Japan, Jul. 4, 1988, 63-166387; Mar. 13, 1989, 60232

Int. Cl.[5] C08G *2/00*

U.S. Cl. 528—230 **14 Claims**



1. A polyacetal resin composition prepared by melt-kneading a polyacetal resin (A) (99 to 40 wt. %) with a thermoplastic polyurethane (B) (1 to 60 wt. %) in the presence of a polyisocyanate compound, a polyisothiocyanate compound or a dimer or trimer thereof (C) in an amount of 0.1 to 10 wt. % based on the total of A and B.

4,929,713

PREPARATION OF OPEN CHAIN POLY(REISSERT COMPOUNDS)

Harry W. Gibson, and Yajnanarayana H. R. Jois, both of Blacksburg, Va., assignors to Virginia Polytechnic Institute and State University, Blacksburg, Va.

Filed Oct. 6, 1989, Ser. No. 418,312

Int. Cl.[5] C08G *2/00*

U.S. Cl. 528—230 **8 Claims**

1. A process for the formation of the open chain poly Reissert product of the reaction product of an aromatic dialdehyde, a primary amine and an aliphatic diacid chloride which comprises:

(a) reaction of an aromatic dialdehyde with a primary amine in the presence of cyanide and bisulfite to yield a reaction product thereof; and

(b) reaction of the reaction product with an aliphatic diacid chloride to yield the open chain poly Reissert product thereof.

4,929,714

FLEXIBLE, BIAXIALLY ORIENTED FILMS OF MODIFIED POLY (ETHYLENE TEREPHTHALATE)

Jimmy R. Trotter, and Bobby J. Sublett, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 19, 1988, Ser. No. 246,045
Int. Cl.[5] C08G 63/02
U.S. Cl. 528—272 5 Claims

1. The method of rendering a polymer having an I.V. of at least 0.6 and repeat units from terephthalic acid and ethylene glycol resistant to flex cracking when in the form of a biaxially oriented film having a thickness of about 0.5–5 mils comprising copolymerizing therewith a monomer having (a) or (b) or a combination of (a) and (b) as follows:

(a) repeat units from a dibasic acid having a molecular weight of about 200–600 in an amount of about 2–20 mole % based on 200 mole % for carboxyl and hydroxyl moieties;

(b) repeat units from a glycol having a molecular weight of about 200–6,000 in an amount of 2–20 percent based on polymer weight, the total of (a) and (b) not exceeding about 20%.

4,929,715

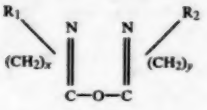
REDUCTION OF CARBOXYL END GROUPS IN POLYESTER WITH DILACTIM ETHERS

Yousef Mohajer, Midlothian, and Stanley D. Lazarus, Petersburg, both of Va., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Jan. 3, 1989, Ser. No. 292,863
Int. Cl.[5] C08G 63/02
U.S. Cl. 528—272 15 Claims

1. A method of melt spinning high molecular weight polyester polymer to produce fibers with reduced carboxyl end group concentration comprising

admixing and reacting with molten polyester polymer an effective amount of at least one lactim compound of the formula



wherein

x and y may be alike or different and represent an integer of 2 to 15 and

R_1 and R_2 are independently hydrogen, halogen, nitro, amine, C_1–C_{10} alkyl, C_5–C_{12} cycloalkyl, C_7–C_9 alkyl aromatic, or C_6–C_{10} aromatic;

forcing the reacted molten polymer under pressure to a spinneret;

and extruding the lactim reacted polymer into a zone of lower pressure and temperature to form a fiber.

4,929,716

POLYOXYALKYLENE POLYIMIDE POLYMERS

John A. Tyrell, Dalton, Mass., and Russell J. McGready, Downingtown, Pa., assignors to General Electric Company, Pittsfield, Mass.

Filed Dec. 31, 1987, Ser. No. 140,304
Int. Cl.[5] C08G 69/26
U.S. Cl. 528—353 19 Claims

1. A polyoxyalkylene polyimide polyester composition which is the reaction product of:

(a) at least one low molecular weight diol;

(b) at least one dicarboxylic acid; and

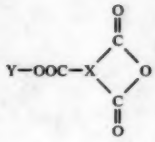
(c) at least one diacid derived from:

(i) at least one poly(oxy alkylene)diamine;

(ii) at least one tetracarboxylic acid or derivative thereof having the formula:

wherein X' is a tetravalent organic radical; and

(iii) at least one tricarboxylic acid or derivative thereof having the formula



wherein:

X is a trivalent organic radical; and

Y is hydrogen or a monovalent organic radical.

4,929,717

METHOD OF PREPARING POLYMERS WITH A LOW RESIDUAL CONTENT OF MONOMERS

Miroslav Chmelir, Krefeld, Fed. Rep. of Germany, assignor to Chemische Fabrik Stockhausen GmbH, Krefeld, Fed. Rep. of Germany

Filed Jul. 21, 1988, Ser. No. 222,434
Claims priority, application Fed. Rep. of Germany, Jul. 25, 1987, 3724709
Int. Cl.[5] C08F 6/10
U.S. Cl. 528—490 13 Claims

1. In the treatment of a homopolymer or copolymer based on at least one of acrylic acid and acrylamide with a compound that can react with the double bond of residual monomer contained therein which homopolymer or copolymer is water-soluble or swells up in water and has a low residual monomer content, the improvement which comprises effecting such treatment with hydroxylamine or a salt thereof acting on the homopolymer or copolymer in swollen form and in the form of a gel.

4,929,718

SYNTHETIC NOXIUSTOXIN RELATED PEPTIDES

Lourival D. P. Possani; Georgina B. Gurrola, both of Cuernavaca; Marco A. A. C. Bayon, and Maria B. Sitges, both of Mexico, all of Mexico, assignors to Universidad Nacional Autonoma De Mexico, Dependence, Mexico

Filed Dec. 14, 1987, Ser. No. 132,169
Int. Cl.[5] C07K 7/06, 7/08
U.S. Cl. 530—326 3 Claims

1. A peptide that is capable of specifically blocking the potassium channels of excitable membranes consisting of the following amino acid sequence: Threonine-Isoleucine-Isoleucine-Asparagine-Valine-Lysine-Cysteine-Threonine-Serine.

4,929,719

FIBER-REACTIVE DYES CONTAINING AN ANILINE RADICAL WHICH CARRIES TWO DIFFERENT VINYLSULFONYL MOIETIES

Hansrudolf Schwander, Riehen; Athanassios Tzikas, Pratteln, and Peter Aeschlimann, Allschwil, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

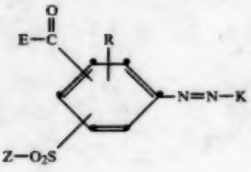
Continuation of Ser. No. 172,617, Mar. 24, 1988, abandoned. This application Aug. 10, 1989, Ser. No. 394,302

Claims priority, application Switzerland, Mar. 27, 1987, 1182/87

Int. Cl.[5] C09B 62/02, 62/507, 62/44, 62/62

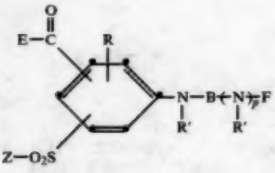
U.S. Cl. 534—604 21 Claims

1. A reactive dye of the formula



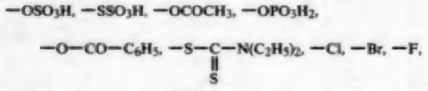
(2)

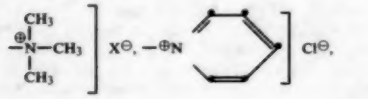
or of the formula

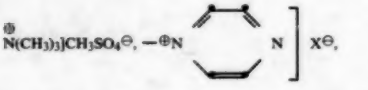


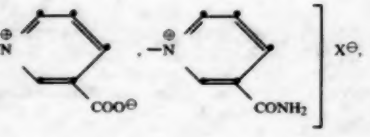
(14)

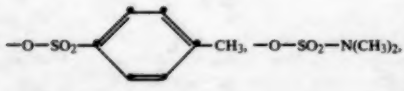
in which R is hydrogen, halogen, hydroxyl or sulfo, Z is a radical of the formula —CH=CH$_2$ or —CH$_2$—CH$_2$—Y, Y is a radical selected from the group consisting of











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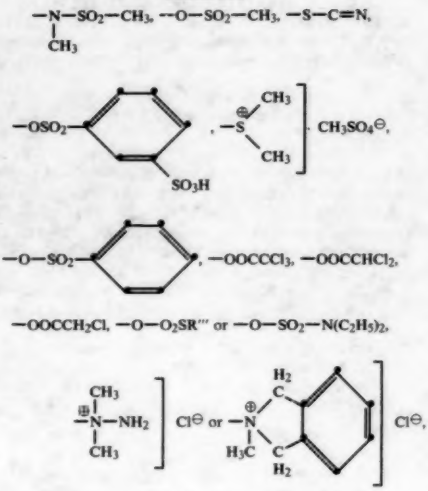
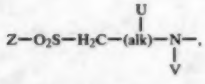
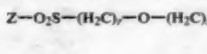


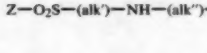
wherein X is halogen and R''' is alkyl or aryl, R' is hydrogen or C$_1$–C$_4$alkyl which is unsubstituted or substituted by —COOH, —CN, —OH or —SO$_3$H, and E is a radical of the formula



(Ia)

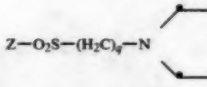


(Ib)



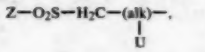
(Ic)

or



(Id)

in which R' and Z are as defined above, alk, alk' and alk'' independently of one another are C$_1$–C$_6$alkylene, U is hydrogen, halogen, hydroxyl, sulfato, C$_1$–C$_4$alkanoyloxy, cyano, carboxyl, C$_1$–C$_4$alkoxycarbonyl, carbamoyl or a radical —SO$_2$—Z in which Z is as defined above, V is hydrogen, C$_1$–C$_4$alkyl which is unsubstituted or substituted by halogen, hydroxyl, cyano, carboxyl, sulfo, sulfato, C$_1$–C$_4$-alkoxy or C$_1$–C$_4$alkoxycarbonyl, or a radical of the formula



in which Z, alk and U are as defined above, q, r and s independently of one another are an integer from 1 to 6; K is a coupling component benzene, naphthalene or heterocyclic radical, B is a bridge member and F is a metal-free or metal-containing monoazo or disazo dye radical containing at least one —SO$_3$H— group, a 1-aminoanthraquinone or 1-anilinoanthraquinone radical, a sulfophthalocyanine dye radical or a

formazan, phenazine, oxazine or nitroaryl dye radical and p is 0 or 1; and a metal complex of a dye of formula (2).

4,929,720

ISOTHIAZOLEAZO HYDROXYPYRIDONE DYES

Guenter Hansen; Ernst Schefczik, both of Ludwigshafen, and Helmut Reichelt, Neustadt, all of Fed. Rep. of Germany, assignors to Basf Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

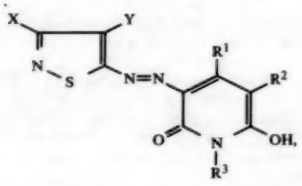
Filed Nov. 10, 1988, Ser. No. 269,686

Claims priority, application Fed. Rep. of Germany, Nov. 12, 1987, 3738372

Int. Cl.[5] **C09B** *29/039, 29/42, 29/042;* **D06P** *3/54*

U.S. Cl. 534—766 **4 Claims**

1. An isothiazoleazo of the formula I:



(I)

where

X is a C_1–C_8-alkyl, a C_1–C_8-alkyl substituted with chlorine, bromine, cyano, hydroxyl, C_1–C_4-alkoxy, phenoxy, C_1–C_4-alkoxycarbonyl, phenyl or phenyl substituted with C_1–C_4-alkyl, C_1–C_4-alkoxy, chlorine, bromine or cyano, or X is phenyl or phenyl substituted with C_1–C_4-alkyl, hydroxyl, C_1–C_4-alkoxy, phenoxy, chlorine, bromine, C_1–C_4-alkoxycarbonyl, cyano or C_1–C_4-dialkylaminosulphonyl,

Y is hydrogen, cyano, chlorine or bromine,

R^1 is hydrogen, C_1–C_4-alkyl or phenyl,

R^2 is hydrogen, cyano, carbamoyl, C_1–C_4-monoalkyl- or -dialkyl-carbamoyl, C_1–C_6-alkanoyl, C_1–C_6-alkoxycarbonyl or 2-(C_1–C_4-alkoxy)-ethoxycarbonyl and

R^3 is hydrogen, C_1–C_8-alkyl, C_1–C_8-alkyl substituted with phenyl, cyano, C_1–C_8-alkoxycarbonyl, phenoxycarbonyl, halogen, hydroxyl, C_1–C_8-alkanoyloxy, benzoyloxy, C_5–C_7-cycloalkoxy or phenoxy or C_1–C_8-alkyl interrupted by one or two oxygen atoms, or is C_5–C_7-cycloalkyl, C_3–C_6-alkenyl or phenyl.

4,929,721

POLYMERIZABLE AROMATIC-AZO-ALIPHATIC COMPOUNDS CAPABLE OF GENERATING PHOTOINITIATED FREE RADICALS

Richard A. Wolf, Midland, Mich., and Paul V. Grosso, West Hartford, Conn., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jun. 29, 1988, Ser. No. 213,208

Int. Cl.[5] **C07C** *107/02, 107/04;* **C08G** *63/100*

U.S. Cl. 534—885 **14 Claims**

1. An azo compound comprising:

(1) an azo group;

(2) an aromatic moiety bonded to one nitrogen atom of said azo group, said aromatic moiety having a polymerization olefin substituent; and

(3) an aliphatic moiety bonded to the other nitrogen atom of said azo group, said aliphatic group having an oxygen-containing, nitrogen-containing, sulfur-containing or halogen substituent bonded to the α carbon thereof

wherein the olefin moiety comprises no more than about 6 carbon atoms; the aromatic moiety is a carbocyclic group with no more than about 10 carbon atoms; the aliphatic moiety comprises no more than about 12 carbon atoms; and the substituent on the α carbon is a hydroxy, alkoxy, amine, aminoalkyl, thioalkyl, thiol or halo group.

4,929,722

ACID DECRYSTALLIZATION OF AMINOPOLYSACCHARIDES AND DERIVATIVES THEREOF

Emmett M. Partain, III, and George L. Brode, II, both of Bound Brook, N.J., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

PCT No. PCT/US87/01246, § 371 Date Feb. 3, 1988, § 102(e) Date Feb. 3, 1988, PCT Pub. No. WO87/07618, PCT Pub. Date Dec. 17, 1987

Continuation-in-part of Ser. No. 871,381, Jun. 6, 1986, abandoned. This PCT application Jun. 2, 1987, Ser. No. 189,312

Int. Cl.[5] **C08B** *37/08;* **A61K** *7/48;* **A61L** *15/01*

U.S. Cl. 536—20 **22 Claims**

1. A heterogeneous method for preparing chitin or chitosan derivative from highly crystalline, partially deacetylated chitin or chitosan which comprises the steps of:

(a) forming a mixture of a pulverulent, partially deacetylated chitin or chitosan and

(1) a diluent medium in which the chitin or chitosan is swellable but essentially insoluble; the medium comprised of:

(i) an inert, water soluble polar organic diluent in which the chitin or chitosan is insoluble and the chitin or chitosan derivative is insoluble;

(ii) at least one organic acid which is at least partially soluble in water, is sufficiently acidic to form the ammonium salt of the chitin or chitosan and yet not sufficiently acidic to cause hydrolysis of the chitin or chitosan or the chitin or chitosan derivative, and which is present in an amount sufficient to protonate the reactive sites of the decacetylated chitin or chitosan;

(2) water in an amount in excess of the amount of organic acid and up to about 65 weight percent of the medium;

(b) agitating the mixture at a temperature and for a period of time to effect at least partial decrystallization; and

(c) recovering the chitin or chitosan derivative from the mixture.

4,929,723

PROCESS FOR PREPARING 2-DEOXYNUCLEOSIDES

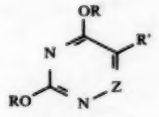
John N. Freskos, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Continuation of Ser. No. 76,100, Jul. 21, 1987, abandoned. This application Apr. 21, 1989, Ser. No. 341,428

Int. Cl.[5] **C07H** *19/073, 19/173*

U.S. Cl. 536—23 **13 Claims**

11. In a process for preparing a nucleoside by reacting a pyrimidine corresponding to the formula:



wherein R is trimethylsilyl, R' is hydrogen, alkyl, alkoxy, chloro, bromo, fluoro, iodo, nitro, cyano, trifluoromethyl, bromovinyl, or acetyl, and Z is CH or N, with a protected 1-halo-2-deoxy sugar in which the free hydroxy groups are blocked with acetyl, benzoyl, p-chlorobenzoyl, p-nitrobenzoyl, p-toluyl, or benzyl groups in the presence of a Lewis acid catalyst and a halohydrocarbon solvent, the improvement which comprises increasing the beta-anomer selectivity by employing cuprous iodide as the Lewis acid.

4,929,724

PROCESS FOR THE PRODUCTION OF URETDIONE GROUP-CONTAINING COMPOUNDS, THE COMPOUNDS OBTAINED ACCORDING TO THIS PROCESS AND THE USE THEREOF IN THE PRODUCTION OF POLYURETHANE PLASTICS MATERIAL

Theodor Enghert, Dormagen; Jürg Fröhlich, Burscheid; Werner Kubitza, Leverkusen, all of Fed. Rep. of Germany; Peter Breidenbach, Baytown, Tex., and Gerhard Mennicken, Leverkusen, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany

Filed Oct. 3, 1985, Ser. No. 783,704

Claims priority, application Fed. Rep. of Germany, Oct. 13, 1984, 3437635

Int. Cl.[5] C07D *229/00*

U.S. Cl. 540—202 **15 Claims**

1. A process for the production of compounds having uretdione groups by dimerizing at least a portion of the isocyanate groups of organic isocyanates having aliphatically-bound isocyanate groups in the presence of catalysts having phosphorus-nitrogen bonds and, additionally, in the presence of co-catalysts which are H-active organic compounds with a pKs-value of at least 6, said H-active organic compounds having at least one hydrogen atom bonded to oxygen, sulphur or nitrogen.

4,929,725

PERFLUOROAMINOETHERS

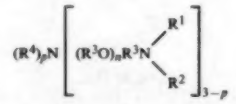
George G. I. Moore, P.O. Box 33427, and John C. Hansen, both of P.O. Box 33427, St. Paul, Minn. 55133

Division of Ser. No. 894,311, Aug. 14, 1986, Pat. No. 4,788,339, and a continuation-in-part of Ser. No. 773,314, Sep. 6, 1985, abandoned. This application Aug. 24, 1988, Ser. No. 236,033

Int. Cl.[5] C07D *211/04, 265/30*

U.S. Cl. 544—87 **7 Claims**

1. Perfluoroaminoethers having the general formula



where each R^1 and R^2 are perfluoroalkyl radicals which together with the nitrogen atom form a 5— or 6—member ring which may be substituted with one or more $—CF_3$, $—C_2F_5$, or $—C_3F_7$ radicals and may contain ether oxygen or additional tertiary amino nitrogen as ring atoms, each R^3 is independently selected from acyclic perfluoroalkylene groups having 2 to 3 carbon atoms at least 2 of which are vicinal, catenary atoms, and perfluorocyclohexylene groups, R^4 is a perfluoroalkyl radical having one to six carbon atoms, or perfluorocyclohexyl, and n is 1 to 3 and p is 0 or 1.

4,929,726

NOVEL DIAZINES AND THEIR METHOD OF PREPARATION

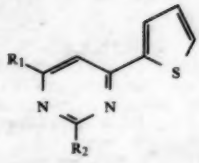
Lucjan Strekowski, Stone Mountain; Maria Mokrosz, Decatur, and Donald B. Harden, Atlanta, all of Ga., assignors to Georgia State University Foundation, Inc., Atlanta, Ga.

Filed Feb. 9, 1988, Ser. No. 153,998

Int. Cl.[5] C07D *413/04, 413/14*

U.S. Cl. 544—122 **17 Claims**

11. A pyrimidine of the general formula



wherein:

R_1 is any aromatic or substituted aromatic group and R_2 is a hydroxide, alkoxide, or mercaptide.

4,929,727

IMPROVED PROCESS FOR PRECIPITATING CYTOSINE FROM ALKALINE SOLUTIONS WITH SULFURIC ACID

Georg Hilgers, Ingelheim am Rhein, and Joachim Hess, Bingen, both of Fed. Rep. of Germany, assignors to Boehringer Ingelheim KG, Ingelheim am Rhein, Fed. Rep. of Germany

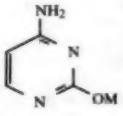
Filed Aug. 25, 1989, Ser. No. 398,864

Claims priority, application Fed. Rep. of Germany, Aug. 27, 1988, 3829100

Int. Cl.[5] C07D *239/34, 239/42*

U.S. Cl. 544—317 **9 Claims**

1. A process for precipitating cytosine from an aqueous solution of



wherein

M is a cation which comprises:

(a) heating the solution to about 50°–80° C.;

(b) adjusting the pH of such heated solution with sulphuric acid to about 2–7;

(c) removing solid constituents from the resulting solution; and

(d) cooling the remaining solution to about 20° C.; and

(e) recovering the precipitated cytosine.

4,929,728

PROCESS FOR PREPARING 3-(1H-TETRAZOL-5-YL)-4(3H)-QUINAZOLINONE

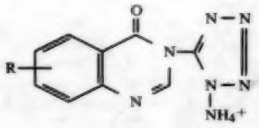
Ji-Wang Chern; Kang-Chien Liu, and Chia-Yin Chen, all of Taipei, Taiwan, assignors to National Science Council, Taipei, Taiwan

Filed Nov. 2, 1989, Ser. No. 430,285

Int. Cl.[5] C07D *401/04*

U.S. Cl. 544—284 **5 Claims**

1. A process for preparing 3-(1H-tetrazol-5-yl)-4(3H)-quinazolinone ammonium salts of formula I:

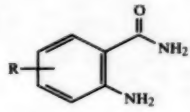


(I)

wherein:

R is hydrogen, halogen, C_1–C_3 alkyl or C_1–C_3 alkoxy, which process comprises:

reacting ethyl N-(1H-tetrazol-5-yl) formimidate in an inert solvent with substituted anthranilamide of formula IV



(IV)

wherein R is as define above.

4,929,729

PROCESS FOR PRODUCING 2-AMINO-4,6-DICHLOROPYRIMIDINE

Takahiro Haga; Yasuhiro Tsujii; Tatsuo Isogai; Shigeo Murai, and Toshihiro Tanaka, all of Kusatsu, Japan, assignors to Ishihara Sangyo Kaisha Ltd., Osaka, Japan

Filed Jan. 31, 1989, Ser. No. 304,031

Claims priority, application Japan, Feb. 19, 1988, 63-37023

Int. Cl.[5] C07D *239/42*; C07F *9/65*

U.S. Cl. 544—330 **11 Claims**

1. A process for producing 2-amino-4,6-dichloropyrimidine, which comprises reacting 2-amino-4,6-dihydroxypyrimidine or its salt with phosphorus oxychloride at a temperature of from 50°to 100° C. in the presence of a solvent and an acid removing agent.

4,929,730

BIS(1,2,5)THIADIAZOLO(3,4-B:3',4'-E) PYRAZINE, A PROCESS FOR THE PREPARATION THEREOF AND A METHOD OF USING SAME

Toshio Mukai, 1-2, Tsunogoro 2-chome, Sendai-shi, Miyagi, and Yoshiro Yamashita, Miyagi, both of Japan, assignors to Fuji Xerox Co., Ltd., Tokyo and Toshio Mukai, Miyagi, both of, Japan

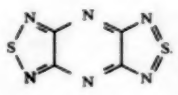
Filed Sep. 7, 1988, Ser. No. 241,278

Claims priority, application Japan, Sep. 8, 1987, 62-223142

Int. Cl.[5] C07D *513/14*

U.S. Cl. 544—345 **1 Claim**

1. A compound having the formula (I):



(I)

4,929,731

METHOD FOR THE SYNTHESIS OF HUPERZINE A AND ANALOGS THEREOF AND COMPOUNDS USEFUL THEREIN

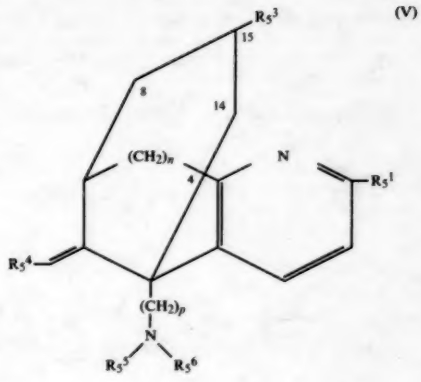
Alan P. Kozikowski, Pittsburgh, Pa., and Yan Xia, Baltimore, Md., assignors to University of Pittsburgh, Pittsburgh, Pa.

Filed Feb. 21, 1989, Ser. No. 313,118

Int. Cl.[5] C07D *221/22*

U.S. Cl. 546—97 **3 Claims**

1. A compound of general formula V:



(V)

wherein:

R_5^1 is selected from the group consisting of H and C_1–C_8 linear or branched alkoxy;

R_5^3 is selected from the group consisting of H and C_1–C_8 linear or branched alkyl;

R_5^4 is selected from the group consisting of H and C_1–C_8 linear or branched alkyl;

R_5^5 is selected from the group consisting of H and C_1–C_8 linear or branched alkyl;

R_5^6 is selected from the group consisting of H and C_1–C_8 linear or branched alkyl;

n_4 is an integer from 0 to 4;

p is 0 or 1;

represents a double bond between carbon 14 and 15 or a double bond between carbon 8 and 15.

4,929,732

N-SUBSTITUTED TETRAHYDROQUINOLINES FOR USE AS ANTIOXIDANTS IN LUBRICANTS

Hans R. Meier, and Samuel Evans, both of Marly, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

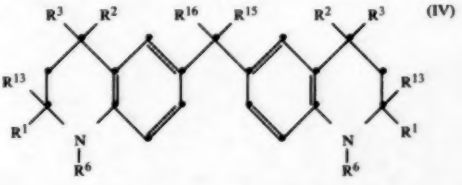
Division of Ser. No. 135,964, Dec. 21, 1987, Pat. No. 4,828,741. This application Feb. 2, 1989, Ser. No. 305,039

Claims priority, application Switzerland, Dec. 30, 1986, 5253/86

Int. Cl.[5] C07D *215/06*

U.S. Cl. 546—158 **3 Claims**

2. A compound of the formula IV



(IV)

in which R^1 and R^2 are independently of each other C_1–C_8-alkyl, unsubstituted or C_1–C_{12}-alkyl or C_1–C_{12}-alkoxy-mono- or di-substituted phenyl or naphthyl, or benzyl, R^3 is hydrogen or methyl, R^6 is C_1–C_{18}-alkyl, C_3–C_8-alkenyl, C_7–C_{12}-alkaryl or C_1–C_{12}-alkyl- or C_1–C_{12}-alkoxy-mono- or di- ring-substituted benzyl, R^{13} is hydrogen or methyl, R^{15} and R^{16} are independently of each other hydrogen, C_1–C_9-alkyl, unsubstituted or C_1–C_{12}-alkyl-substituted phenyl, benzyl, α-methylbenzyl or α,α-dimethylbenzyl.

4,929,733

PREPARATION OF N-HETEROCYCLES

Michael Hesse, Ludwigshafen; Wolfgang Hoelderich, Frankenthal, and Matthias Schwarzmann, Limburgerhof, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

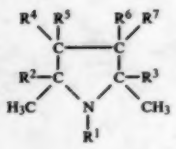
Filed Jun. 17, 1988, Ser. No. 207,861

Claims priority, application Fed. Rep. of Germany, Jul. 1, 1987, 3721777

Int. Cl.[5] C07D *207/06, 211/14*

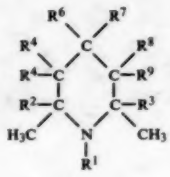
U.S. Cl. 546—184 **9 Claims**

1. A process for the preparation of an N-heterocycle of the formula (I) or (II)



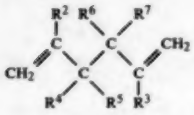
(I)

or



(II)

wherein R^1 and R^4 to R^9 are each hydrogen or alkyl, wherein each of R^2 and R^3 is alkyl, and wherein an olefin of the formula (III) or (IV)



(III)

or

(IV)

where R^2 to R^9 have the above meanings, is reacted with NH_3 or with a primary amine of the formula H_2NR^1, where R^1 has the above meanings, in the presence of a zeolite as a catalyst.

4,929,734

TETRAHYDROPYRIDINE OXIME COMPOUNDS

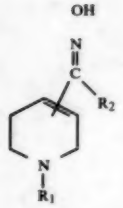
Linda L. Coughenour; Robert E. Davis; David A. Downs; Thomas G. Heffner; Leonard T. Meltzer; Walter H. Moos; David W. Moreland, and Haile Tecle, all of Ann Arbor, Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

Continuation-in-part of Ser. No. 32,839, Mar. 31, 1987, Pat. No. 4,798,841. This application Oct. 18, 1988, Ser. No. 259,081

Int. Cl.[5] A61K *31/44;* **C07D** *211/70*

U.S. Cl. 546—338 **6 Claims**

1. A compound having the formula



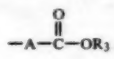
1

wherein R^1 is selected from hydrogen;

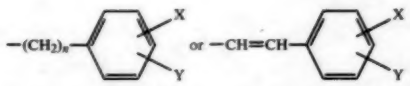
straight or branched alkyl of from one to six carbon atoms unsubstituted or substituted with hydroxy or alkoxy of from one to four carbon atoms;

straight or branched alkenyl of from two to six carbon atoms unsubstituted or substituted with hydroxy or alkoxy of from one to four carbon atoms;

straight or branched alkynyl of from two to six carbon atoms unsubstituted or substituted with hydroxy or alkoxy of from one to four carbon atoms;



where A is a bond or is a hydrocarbon chain of from one to four carbon atoms, unsubstituted or substituted with halogen, and when containing two or more carbon atoms may contain one double bond and R_3 is alkyl of from one to six carbon atoms; or



where n is zero, two, three or four and X and Y are independently selected from

hydrogen,

fluorine,

chlorine,

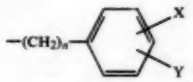
bromine,

hydroxy,

straight or branched alkyl of from one to three carbon atoms, or

alkoxy of from one to four carbon atoms; or

R_2 is selected from; straight or branched alkynyl of from two to six carbon atoms unsubstituted or substituted with hydroxy or alkoxy of from one to four carbon atoms;



where n is zero to six and

X and Y are independently selected from

hydrogen,

fluorine,

chlorine,

bromine,

hydroxy,

straight or branched alkyl of from one to three carbon atoms, or alkoxy of from one to four carbon atoms;

with the proviso that R_1 and R_2 may not both simultaneously be hydrogen; or a pharmaceutically acceptable salt thereof.

4,929,735

PROCESS FOR THE PREPARATION OF OXIRANES

Wolf Reiser, Wuppertal, and Peter Feyen, Mettmann, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

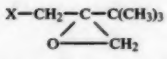
Continuation of Ser. No. 921,712, Oct. 20, 1986, abandoned. This application Apr. 22, 1988, Ser. No. 185,211

Claims priority, application Fed. Rep. of Germany, Oct. 24, 1985, 3537817

Int. Cl.[5] C07D *301/04, 405/06*

U.S. Cl. 548—268.8 6 Claims

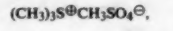
1. A process for the preparation of an oxirane of the formula



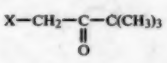
in which

X is 4-chlorobenzyl, 4-phenylphenoxy or 1H-(1,2,4)-triazolyl,

comprising reacting dimethyl sulphate with an excess of dimethyl sulphide thereby to form trimethylsulphonium methylsulphate of the formula



and without prior isolation reacting the trimethylsulphonium methyl-sulphate with a ketone of the formula



in the presence of solid potassium hydroxide or sodium hydroxide in dimethyl sulphide at a temperature between 0° C. and 50° C., 2 to 15 moles of dimethyl sulphide, 1 to 3 moles of dimethyl sulphate and 1 to 6 moles of potassium hydroxide or sodium hydroxide being employed per mole of ketone.

4,929,736

LATENT ISOCYNATE DERIVATIVES USEFUL FOR DEACTIVATING ENZYMES

William C. Groutas, Wichita, Kans., assignor to Board of Trustees of the Wichita State Un versity, Wichita, Kans.

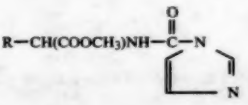
Continuation-in-part of Ser. No. 756,252, Jul. 18, 1985, abandoned. This application Nov. 6, 1987, Ser. No. 117,531

Claims priority, application Canada, Jul. 17, 1986, 514030; Japan, Jul. 18, 1986, 61-168235

Int. Cl.[5] C07D *233/54*

U.S. Cl. 548—341 1 Claim

1. A compound having the formula:



wherein R is a member selected from the group consisting of L $(CH_3)_2CH$—; L CH_3—CH_2—CH_2—; DL CH_3—CH_2—CH_2—CH_2; L$(CH_3)_2$ CH—CH_2—; and L CH_3—CH_2—CH—$(CH_3)_2$.

4,929,737

HYDROGENATION OF HALONITROAROMATIC COMPOUNDS

Carl M. Lentz, Kingsport; Edward T. Mullins, Church Hill, and Charles L. Gibson, Kingsport, all of Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 3, 1988, Ser. No. 151,726

Int. Cl.[5] C07D *231/00, 127/19, 143/80, 103/22*

U.S. Cl. 548—365 5 Claims

1. Process for the preparation of a haloaromatic amine which comprises hydrogenating the corresponding halonitroaromatic compound in the presence of a catalytic amount of a chromium containing Raney cobalt catalyst under hydrogenation conditions of temperature and pressure.

4,929,738

THIENYL AND FURYL CONTAINING DERIVATIVES

Klaus Jelich, Wuppertal; Wilhelm Brandes, Leichlingen; Gerd Hänssler, and Paul Reinecke, both of Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

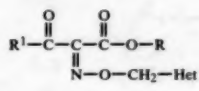
Division of Ser. No. 192,799, May 11, 1988, Pat. No. 4,864,029, which is a division of Ser. No. 890,245, Jul. 24, 1986, Pat. No. 4,767,775. This application May 10, 1989, Ser. No. 350,064

Claims priority, application Fed. Rep. of Germany, Aug. 10, 1985, 3528573

Int. Cl.[5] C07D *307/16, 307/46, 333/24*

U.S. Cl. 549—76 2 Claims

1. An alkoximinocarboxylic acid ester of the formula

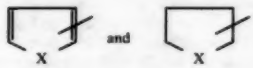


in which

R represents alkyl,

R^1 represents hydrogen, alkyl, alkenyl, alkinyl, cyanoalkyl, hydroxyalkyl, alkoxyalkyl, alkylthioalkyl, alkoxycarbonyl, hydroxycarbonylalkyl, alkoxycarbonylalkyl, aminocarbonylalkyl, alkylaminocarbonylalkyl or dialkylaminocarbonylalkyl or optionally substituted oxiranylalkyl, aralkyl, heterocyclyl or aryl and

Het represents a heterocyclic radical selected from the group consisting of



which is optionally mono-, di- or trisubstituted by identical or different substituents and/or benzo-fused, the optional substituents being selected from the group consisting of fluorine, chlorine, bromine, methyl, ethyl, n- or i-propyl, n-, i-, s-, or t-butyl, methoxy, ethoxy, trifluoromethyl and phenyl which is optionally mono-, di-, or substituents from the group consisting of chlorine, nitro, methyl and methoxy, and

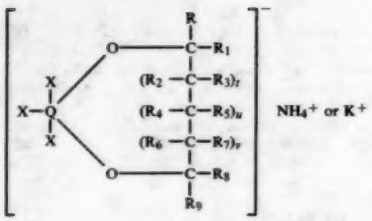
X represents oxygen or sulphur.

4,929,739
COMPLEXES OF TELLURIUM AND SELENIUM DERIVATIVES

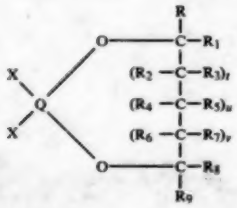
Benjamin Sredni, Beni Brak, Israel; Leo Pavliv, Somerville, N.J., and Michael Albeck, Ramat-Gan, Israel, assignors to Bar-Ilan University, Ramat-Gan, Israel

Filed Mar. 24, 1988, Ser. No. 172,643
The portion of the term of this patent subsequent to Jun. 21, 2005, has been disclaimed.
Int. Cl.[5] C07D *321/02, 321/12, 319/04, 317/08*
U.S. Cl. 549—347 17 Claims

1. A complex of a compound of the formula:



(A)



(B)

or

$PhTeCl_3$ (C)

or

$(C_6H_5)_4{}^+P(TeCl_3(O_2C_2H_4)^-$ (D)

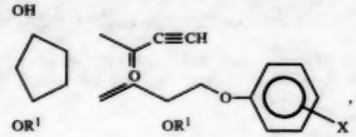
wherein Q is Te or Se; t is 1 or 0; u is 1 or 0; v is 1 or 0; R, R_1, R_2, R_3, R_4, R_5, R_6, R_7, R_8, and R_9 are the same or different and are independently selected from the group consisting of hydrogen, hydroxyalkyl of 1 to 5 carbons, hydroxy, alkyl of from 1 to 5 carbon atoms, halogen, haloalkyl of 1 to 5 carbon atoms, carboxy, alkylcarbonylalkyl of 2 to 10 carbons, alkanoyloxy of 1 to 5 carbon atoms, carboxyalkyl of 1 to 5 carbons atoms, acyl, amido, cyano, amidoalkyl of 1 to 5 carbons, N-monoalkylamidoalkyl of 2 to 10 carbons, N,N-dialkylamidoalkyl of 4 to 10 carbons, cyanoalkyl of 1 to 5 carbons, alkoxy of 1 to 5 carbon atoms, alkoxyalkyl of 2 to 10 carbon atoms and —COR_{10} wherein R_{10} is alkyl of from 1 to 5 carbons; and X is halogen with a non-toxic pharmaceutically acceptable complexing agent selected from the group consisting of hydroxy polycarboxylic acids, polycarboxylic acids or polyhydroxy polycarboxylic acids.

4,929,740
PROCESS FOR MAKING 16-PHENOXY- AND 16-(SUBSTITUTED PHENOXY)-PROSTATRIENOIC ACID DERIVATIVES

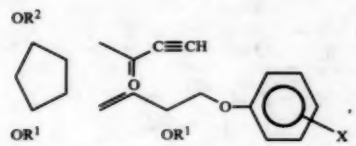
Gary F. Cooper, Mountain View, Calif., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Division of Ser. No. 2,339, Jan. 9, 1987, Pat. No. 4,778,904, which is a continuation of Ser. No. 774,814, Sep. 13, 1985, abandoned, which is a continuation-in-part of Ser. No. 658,950, Oct. 10, 1984, abandoned. This application Jul. 11, 1988, Ser. No. 217,241
Int. Cl.[5] C07D *309/08;* C07C *49/207*
U.S. Cl. 549—415 6 Claims

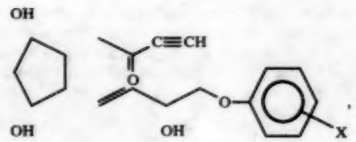
1. A method of preparing a compound selected from the group consisting of compounds of formulae Ia, Ib, and Ic



Ia



Ib



Ic

in which

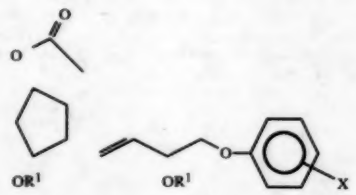
R^1 is a base-stabile, acid-labile ether-forming group;

R^2 is a base-labile ether-forming group; and

X is hydrogen, halo, trifluoromethyl, lower alkyl or lower alkoxy,

which comprises the steps of

(a) reacting a compound of formula II



II

in which

X and R^1 are as defined above with dichlorocerium acetylide to obtain a compound of formula Ia;

optionally followed by

(b) protecting the 1-hydroxy group to obtain a compound of formula Ib; and/or

(c) removing the protecting groups to obtain a compound of formula Ic.

4,929,741
PROPIOLOPHENONE DERIVATIVES

Albert Fischli, Riehen, Switzerland; Eva-Maria Gutknecht, Buggingen-Seefelden, Fed. Rep. of Germany, and Daniel Obrecht, Basel, Switzerland, assignors to Hoffman-La Roche Inc., Nutley, N.J.

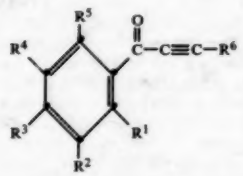
Filed Mar. 17, 1988, Ser. No. 169,643

Claims priority, application Switzerland, Mar. 20, 1987, 1072/87

Int. Cl.[5] C07D *317/44*

U.S. Cl. 549—447 **25 Claims**

1. A compound of the formula



wherein R^1, R^2, R^3, R^4 and R^5 are independently hydrogen, halogen, lower alkyl, lower alkoxy-lower-alkyl, hydroxy, lower alkoxy, lower alkenyloxy, lower alkynyloxy, lower alkoxy-lower-alkoxy, acyloxy, aryl-lower-alkoxy, lower alkylthio, lower alkoxy-lower-alkylthio, lower alkenylthio, lower alkynylthio, aryl-lower-alkylthio, amino which can be monosubstituted by lower alkyl or disubstituted with lower alkyl or lower alkyl and acyl or trifluoromethyl, or two of these substituents which are adjacent jointly and together with the carbon atoms to which they are attached form a 5- to 7-membered ring, and wherein of the substituents R^1 to R^5 at least two are hydrogen and at least one is different from hydrogen; and R^6 is a group of the formula

$$-COOR^7, \quad (a)$$

$$-CONR^8R^9, \quad (b)$$

$$-C(R^{10})=O, \quad (c)$$

$$-C(R^{11})(OR^{12})_2, \quad (d)$$

$$-C(OR^{13})_3 \quad (e)$$

or

$$OC(R^{14})(R^{15})OR^{16}; \quad (f)$$

in which R^7 is hydrogen, lower alkyl, lower alkoxy-lower-alkoxy-lower alkyl, aryl-lower alkyl or lower alkenyl, R^8 and R^9 are lower alkyl, R^{10} is hydrogen, R^{11} is hydrogen, R^{12} is lower alkyl, R^{13} is lower alkyl, R^{14} is hydrogen, R^{15} is hydrogen or lower alkyl and R^{16} is hydrogen, lower alkenyl, lower alkoxy-lower-alkyl or acyl, or a pharmaceutically acceptable salt of an acidic compound of formula with an acid base or of a basic compound of formula with an acid.

4,929,742
SILANE MODIFIED POLYSILACYCLOBUTASILAZANES

Gary T. Burns, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Nov. 28, 1988, Ser. No. 277,080

Int. Cl.[5] C07F *7/10*

U.S. Cl. 556—406 **24 Claims**

1. A process for preparing modified polysilacyclobutasilazanes comprising:

(A) contacting and reacting in an inert, essentially anhydrous atmosphere, a polysilacyclobutasilazane polymer with a compound or mixture of compounds selected from the group consisting of

(i) chlorosilanes having the general formula

$$(R^v)_mSiCl_{4-m} \text{ and}$$

(ii) chlorodisilanes having the general formula

$$\{Si(R^v)_tCl_{3-t}\}_2$$

where, in the general formulae for chlorosilanes and chlorodisilanes, each R^v is independently selected from the group consisting of hydrogen, alkyl radicals having 1 to 4 carbon atoms, aryl radicals, and the vinyl radical; m is 0, 1, or 2; and t is 0 to 2;

at a temperature less than 100° C for a time sufficient to form a partially modified polysilacyclobutasilazane polymer,

(B) contacting and reacting the partially modified polysilacyclobutasilazane polymer with dry ammonia, and

(C) recovering modified polysilacyclobutasilazane polymer.

4,929,743
NOVEL 4,5-DISUBSTITUTED 1,3-THIAZOL-2-YLOXYACETAMIDE HERBICIDES

Heinz Förster, Wuppertal; Gunther Beck, Leverkusen; Erich Klauke, Odenthal; Hans-Joachim Santel, Leverkusen, and Robert R. Schmidt, Bergisch-Gladbach, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

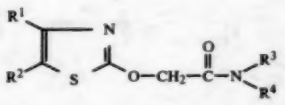
Division of Ser. No. 826,479, Feb. 5, 1986, Pat. No. 4,788,291. This application Jun. 15, 1988, Ser. No. 207,073

Claims priority, application Fed. Rep. of Germany, Feb. 21, 1985, 3505902

Int. Cl.[5] C07D *277/04*

U.S. Cl. 548—187 **13 Claims**

1. A 4,5-disubstituted 1,3-thiazol-2-yloxyacetamide of the formula



in which

R^1 is fluorine or chlorine,

R^2 is alkyl with 1 to 4 carbon atoms or halogenomethyl, and

R^3 and R^4 each independently is alkyl with 1 to 8 carbon atoms, alkenyl or alkinyl each with 2 to 8 carbon atoms, cycloalkyl or cycloalkenyl each with 3 to 7 carbon atoms being unsubstituted or substituted by alkyl with 1 to 4 carbon atoms, alkoxy, alkoxyalkyleneoxy or alkoxyalkyl each with 1 to 8 carbon atoms in the individual alkyl or alkylene moieties, halogenoalkyl with 1 to 8 carbon atoms and 1 to 5 halogen atoms, aralkyl with 6 to 10 carbon atoms in the aryl moiety and 1 to 2 carbon atoms in the alkyl moiety, or aryl with 6 to 10 carbon atoms and optionally substituted by at least one of halogen, alkyl, alkoxy or alkylthio each with 1 to 4 carbon atoms, and halogenoalkyl, halogenoalkoxy or halogenoalkylthio each with 1 to 2 carbon atoms and 1 to 5 halogen atoms, or nitro

or

R^3 and R^4 together with the nitrogen atom to which they are bonded form a 5- to 7-membered heterocyclic ring optionally substituted by alkyl with 1 to 6 carbon atoms optionally in the form of a fused ring system, aryl with 6 to 10 carbon atoms optionally in the form of a fused ring system, or dioxyalkylene with 2 to 3 carbon atoms,

with the exception of the compound 2-(4-chloro-5-difluoromethylthiazol-2-yloxy)-acetic acid N-methyl-anilide.

4,929,744

PROCESS FOR PREPARING HETEROAROMATIC METHYL)-2,2'-BI-1H-IMIDAZOLES

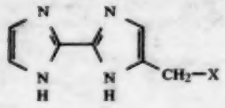
Donald P. Matthews; James R. McCarthy, both of West Chester, Ohio, and Jeffrey P. Whitten, Zionsville, Ind., assignors to Merrell Dow Pharmaceuticals, Cincinnati, Ohio

Division of Ser. No. 78,352, Jul. 28, 1987. This application Mar. 27, 1989, Ser. No. 329,148

Int. Cl.[5] C07D *233/54, 277/20*

U.S. Cl. 548—202 **2 Claims**

1. A process for preparing a compound of the formula

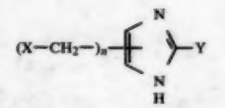


wherein X is 2- or 3-thienyl, 2- or 3-furyl 2- or 4-thiazolyl or phenyl, with each of said groups optionally being substituted; the optional substitution on said thienyl, furyl or thiazolyl groups being 1 or 2 moieties selected from the group consisting of chloro, fluoro, bromo and lower alkyl of from 1 to 6 carbon atoms; the optional substitution on said phenyl group being 1 or 2 moieties selected from the group consisting of chloro, bromo, fluoro, lower alkyl of from 1 to 6 carbon atoms, alkoxy of from 1 to 6 carbon atoms, trifluoromethyl, amino, sulfhydryl, and S(0)mR wherein m is 0, 1or 2 is lower alkyl of from 1 to 6 carbon atoms; which comprises reacting an appropriate α-brominated or α-chlorinated methylated, substituted or non-substituted, monoaromatic ring of the formula

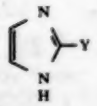
X-CH_2-Br or X-CH_2-Cl

wherein X is as defined above, with 2,2'-bi-1H-imidazole in a solvent such as ethanol and in the presence of a base such as sodium hydroxide under reflux conditions.

2. A process for preparing compounds of the formula



wherein X is 2- or 3-thienyl, 22- or 3-furyl, 2- or 4-thiazolyl or phenyl, with each of said groups optionally being substituted; the optional substitution on said thienyl, furyl or thiazolyl groups being 1 or 2 moieties selected from the group consisting of chloro, fluoro, bromo and lower alkyl of from 1 to 6 carbon atoms; the optional substitution on said phenyl group being 1 or 2 moieties selected from the group consisting of chloro, bromo, fluoro, lower alkyl of from 1 to 6 carbon atoms, alkoxy of from 1 to 6 carbon atoms, trifluromethyl, amino, sulfhydryl, and $S(O)_mR$ wherein m is 0, 1 or 2 and R is lower alkyl of from 1 to 6 carbon atoms and n is 1 or 2; and wherein Y is alkyl, or trialkylsilyl, the alkyl groups being straight- or branched-chain and containing one to ten carbon atoms, and the aryl groups being phenyl or naphthyl, optionally substituted with from 1 to 3 substituents selected from the group containing alkyl of from 1 to 6 carbon atoms, chloro, bromo, fluoro and alkoxy of from 1 to 6 carbon atoms, which comprises reacting a 2-substituted imidazole of the formula



with an appropriate α-brominated or α-chlorinated methylated, substituted or non-substituted, monoaromatic ring of the formula X—CH_2-Br, or X—CH_2-Cl wherein X is an defined above, in a solvent such as ethanol in the presence of a base such as sodium hydroxide under reflux conditions.

4,929,745

TRANSHALOGENATION OF HALOPHOSPHORUS COMPOUNDS

Kestutis A. Keblys; Meng-Sheng Ao, and Lester P. J. Burton, all of Baton Rouge, La., assignors to Ehtyl Corporation, Richmond, Va.

Filed Aug. 1, 1988, Ser. No. 227,231

Int. Cl.[5] C07F *9/14, 9/34, 9/42*

U.S. Cl. 558—84 **14 Claims**

1. A process for exchanging a halogen bonded to a phosphorus atom with fluorine said process comprising reacting a phosphorus compound, having 1–2 halogen atoms selected from chlorine, bromine or iodine bonded directly to phosphorus, with a hydrogen fluoride salt of a pyridine-type compound in an inert solvent at a temperature in the range of 20°–300° C. which is high enough to cause the halogen exchange to proceed but not so high as to cause degradation of the reaction products.

4,929,746

DENTIN AND ENAMEL ADHESIVE

James E. Bunker, White Bear Lake, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 33,520, Apr. 1, 1987, abandoned, which is a division of Ser. No. 665,960, Oct. 29, 1984, Pat. No. 4,669,983, which is a division of Ser. No. 234,560, Feb. 13, 1981. This application Mar. 23, 1989, Ser. No. 328,753

Int. Cl.[5] C07F *9/14*

U.S. Cl. 558—92 **5 Claims**

1. A method for preparing a polymerizable dentin and enamel adhesive comprising an organic ester of one or more acids of phosphorus, comprising the step of mixing BIS-GMA with an acid of phosphorus having chlorine or bromine bonded directly to phosphorus, the amount of said acid of phosphorus being sufficient to cause a mixture of one drop each of (a) said adhesive plus one percent by weight benzoyl peroxide and (b) a solution of three percent by weight sodium benzene sulfinate and one percent by weight N,N-dihydroxyethyl-p-toluidine in ethanol to have an average shear strength on unetched dentin of at least 25 Kg/cm^2.

4,929,747

ORGANIC PEROXIDE HAVING A POLYMERIZATION-REGULATING ABILITY

Takeshi Komai, Chita; Kazuo Matsuyama, Gamagori, and Isao Honma, Chita, all of Japan, assignors to Nippon Oil & Fats Company, Ltd., Japan

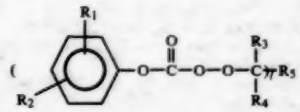
Filed Aug. 13, 1986, Ser. No. 895,995

Claims priority, application Japan, Aug. 21, 1985, 60-181623; Aug. 21, 1985, 60-181624

Int. Cl.[5] C07C *179/18*

U.S. Cl. 558—263 **4 Claims**

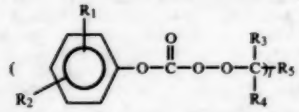
1. An organic peroxide represented by the following general formula (I)



(I)

wherein l is 1, R_1 is a hydrogen atom, R_2 is 2-position-substituting isopropyl group, and R_3, R_4 and R_5 are methyl groups.

4. An organic peroxide represented by the following general formula (I)



wherein l is 2, R_1 and R_2 are hydrogen atoms, R_3 and R_4 are methyl groups and R_5 is an ethylene group.

4,929,748

METHOD OF PREPARING DIALKYL DICARBONATES

Ralph Franklin, Naperville, Ill., assignor to Akzo America Inc., New York, N.Y.

Filed Dec. 7, 1988, Ser. No. 281,123
Int. Cl.[5] C07C *68/04, 69/96*
U.S. Cl. 558—276 **21 Claims**

1. A method for preparing a dialkyl dicarbonate comprising contacting together:
   (a) an alkyl haloformate wherein the alkyl group contains 1 to 20 carbon atoms; and
   (b) an alkali metal carbonate; in the presence of
   (c) a catalytic amount of a crown ether; and
   (d) a solvating amount of a liquid which will dissolve a complex of the alkali metal and the crown ether.

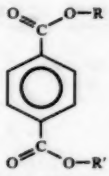
4,929,749

PRODUCTION OF TEREPHTHALATE ESTERS BY DEGRADATIVE TRANSESTERIFICATION OF SCRAP OR VIRGIN TEREPHTHALATE POLYESTERS

Ved P. Gupta, LaSalle, and Louis A. DuPont, Brossard, both of Canada, assignors to Synergistics Industries, Limited, Canada

Filed Mar. 15, 1989, Ser. No. 323,977
Int. Cl.[5] C07C *67/48*
U.S. Cl. 560—79 **11 Claims**

1. A process for producing a compound having the following formula (I):



wherein R and R' are the same or different and represent a straight chain or branched alkyl group having from 6 to 15 carbon atoms, said process comprising, reacting a terephthalate polyester with an alcohol or mixture of alcohols having from six to 15 carbon atoms in the presence of a catalyst and recovering the compound according to formula (I).

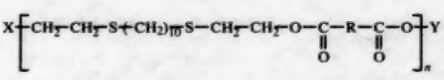
4,929,750

COMPOUNDS HAVING HYPOLIPEMIZING ACTIVITY

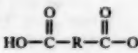
Paolo Ferruti, and Giancarlo Scapini, both of Rome, Italy, assignors to Nuovo Consorzio Sanitario Nazionale, Rome, Italy

Continuation of Ser. No. 929,788, Nov. 13, 1986, abandoned, which is a continuation-in-part of Ser. No. 701,858, Feb. 15, 1985, abandoned. This application Jul. 22, 1988, Ser. No. 224,185
Claims priority, application Italy, Feb. 17, 1984, 19683 A/84
Int. Cl.[5] C07C *69/76*
U.S. Cl. 560—87 **6 Claims**

1. An oligomer or a polymer compound of 1,10-bis(2-hydroxyethylthio)decane and a dicarboxylic acid, of the formula



wherein
n is an integer ranging from 2 to 100
R is an organic biradical which comprises $-CH_2CH_2-$, $-CH_2CH_2CH_2-$, $-CH_2CH_2CH_2CH_2-$, $-CH_2CH_2CH_2CH_2CH_2-$, $-CH_2CH_2CH_2CH_2CH_2CH_2-$, 1,2-phenylene or 1,3-phenylene,
X is HO— or



where R has the above mentioned meaning and Y is H or $CH_2CH_2S(CH_2)_{10}SCH_2CH_2OH$.

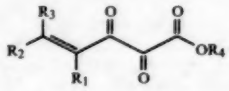
4,929,751

VINYL TRICARBONYL COMPOUNDS AND METHODS OF MAKING THE SAME

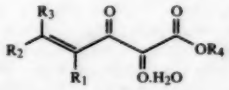
Harry H. Wasserman, New Haven, Conn.; Natesan Murugesan, Lawrenceville, N.J., and John H. Van Duzer, New Haven, Conn., assignors to Yale University, New Haven, Conn.

Filed Oct. 19, 1987, Ser. No. 109,804
Int. Cl.[5] C07C *69/66, 79/46, 101/02, 101/30*; C07D *401/06, 403/06, 405/06, 409/06, 239/26, 277/24, 263/32, 307/46*
U.S. Cl. 560—174 **16 Claims**

1. A vinyl tricarbonyl of the formula



or its monohydrate of the formula



wherein
R_1 is hydrogen, halogen, unsubstituted C_1 to C_{30} alkyl, C_1 to C_{30} alkyl substituted by a substituent selected from the group consisting of halogen, alkoxy, nitro, cyano, amino and hydroxyl, unsubstituted phenyl, unsubstituted naphthyl, substituted phenyl and substituted naphthyl, said substituted phenyl and said substituted naphthyl being substituted by a substituent selected from the group consisting of halogen, alkoxy, nitro, cyano, amino and hydroxyl, benzyl, and cycloalkyl with 3 to 7 carbon atoms,
R_2 is hydrogen, halogen, unsubstituted C_1 to C_{30} alkyl, C_1 to C_{30} alkyl substituted by a substituent selected from the group consisting of halogen, alkoxy, nitro, cyano, amino and hydroxyl, unsubstituted phenyl, unsubstituted naphthyl, substituted phenyl, substituted naphthyl, said substituted phenyl and said substituted naphthyl being substituted by a substituent selected from the group consisting of halogen, alkoxy, nitro, cyano, amino and hydroxyl, benzyl, cycloalkyl with 3 to 7 carbon atoms, cyano, nitro or a heterocyclic selected from the group consisting of furan, furfural, pyrrole, pyridine, thiophene, imidazole, oxazole, thiazole, pyrimidine, purine, guinoline and carbazole,
R_3 is hydrogen, halogen, unsubstituted C_1 to C_{30} alkyl, C_1 to C_{30} alkyl substituted by a substituent selected from the

group consisting of halogen, alkoxy, nitro, cyano, amino and hydroxyl, unsubstituted phenyl, unsubstituted naphthyl, substituted phenyl, substituted naphthyl, said substituted phenyl and said substituted naphthyl being substituted by a substituent selected from the group consisting of halogen, alkoxy, nitro, cyano, amino and hydroxyl, benzyl, cycloalkyl with 3 to 7 carbon atoms, cyano, nitro, or a heterocyclic selected from the group consisting of furan, furfural, pyrrole, pyridine, thiophene, imidazole, oxazole, thiazole, pyrimidine, purine, quinoline and carbazole and

R_4 is unsubstituted C_1 to C_{30} alkyl, C_1 to C_{30} alkyl substituted by a substituent selected from the group consisting of halogen, alkoxy, nitro, cyano, amino and hydroxyl, unsubstituted phenyl, unsubstituted naphthyl, substituted phenyl, substituted naphthyl, said substituted phenyl and said substituted naphthyl being substituted by a substituent selected from the group consisting of halogen, alkoxy, nitro, cyano, amino and hydroxyl, benzyl or cycloalkyl with 3 to 7 carbon atoms.

4,929,752

PROCESS FOR THE PREPARATION OF 1-AMINE-2-NAPHTHOL-4-SULFONIC ACID

Bernhard Albrecht, Buus, Switzerland, and Jürgen Beyrich, Huttingen, Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 95,727, Sep. 14, 1987, abandoned. This application May 12, 1989, Ser. No. 352,652

Claims priority, application Switzerland, Sep. 23, 1986, 3794/86

Int. Cl.[5] **C07C** *143/66*

U.S. Cl. 562—70 **9 Claims**

1. In a process for the preparation of 1-amino-2-naphthol-4-sulfonic acid by nitrosation of 2-naphthol, addition of bisulfite, acidification with mineral acid and reduction of the reaction product so obtained, the improvement which comprises carrying out said nitrosation of 2-naphthol semi-continuously or continuously in a reaction medium which is free of water-miscible organic solvents and which consists essentially of water, and either (a) in the semi-continuous process, charging the reactor with the nitrosating agent and adding an aqueous suspension of 2-naphthol and mineral acid simultaneously in separate streams, or (b) in the continuous process, charging the reactor with a reaction mass obtained from a previous nitrosation and adding said 2-naphthol suspension, mineral acid and the nitrosating agent simultaneously in separate streams to said reaction mass.

4,929,753

PREPARATION OF TRIFLUOROMETHYLBENZOIC ACID FROM HEXAFLUOROXYLENE

Yoshihiko Gotoh, Kamifukuoka, and Toshikazu Kawai, Kawagoe, both of Japan, assignors to Central Glass Company, Limited, Ube, Japan

Filed Apr. 19, 1988, Ser. No. 183,243

Claims priority, application Japan, Apr. 22, 1987, 62-97288

Int. Cl.[5] **C07C** *51/16*

U.S. Cl. 562—411 **9 Claims**

1. A method of preparing trifluoromethylbenzoic acid, comprising the step of reacting α, α, α, α′, α′, α′-hexafluoroxylene with a strong acid in sulfuric acid at least a portion of which is fuming sulfuric acid to thereby hydrolyze one trifluoromethyl group of said hexafluoroxylene.

4,929,754

BENZENESULPHONAMIDOINDANYL COMPOUNDS

Josef Nickl; Armin Heckel; Erich Muller; Berthold Narr; Johannes Weisenberger; Wolfgang Eisert, and Thomas Muller, all of Biberach, Fed. Rep. of Germany, assignors to Dr. Karl Thomae GmbH, Biberach an der Riss, Fed. Rep. of Germany

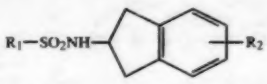
Division of Ser. No. 73,950, Jul. 16, 1987, Pat. No. 4,820,705. This application Feb. 1, 1989, Ser. No. 305,255

Claims priority, application Fed. Rep. of Germany, Jul. 16, 1986, 3623944

Int. Cl.[5] **C07C** *147/107*

U.S. Cl. 562—428 **7 Claims**

1. Benzenesulphonamidoindanyl compounds of the general formula



(I)

in which

R_1 is phenyl optionally mono- or di- substituted by halo, methyl or methoxy, and

R_2 is hydroxycarbonyl or (C_1–C_3-alkoxy)carbonyl, which groups are optionally attached via C_1–C_5 alkylene or C_2-C_5 alkenylene in which optional attachment the methylene group attached to the indanyl may be replaced by hydroxymethylene or carbonyl and further for the methylene group via which the C_2–C_4 alkoxycarbonyl is attached to be substituted by a further C_2–C_4 alkoxycarbonyl.

4,929,755

PROCESS FOR MAKING AN OPTICALLY ACTIVE MIXTURE OF AN N-ACYL-AMINO ACID OR ESTER CONTAINING AT LEAST TWO CHIRAL CENTERS

Mark C. Cesa, South Euclid; Robert A. Dubbert, Solon, and James D. Burrington, Richmond Heights, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Continuation of Ser. No. 784,977, Oct. 7, 1985, abandoned. This application Dec. 19, 1986, Ser. No. 943,480

Int. Cl.[5] **C07C** *99/00*

U.S. Cl. 562—443 **8 Claims**

1. A process which comprises (1) reacting a carboxylic acid, acid halide or anhydride, each of which is optically active and essentially all L or D, with ammonia or a primary amine to make the corresponding amide of such acid, (2) then condensing such amide with an aldehyde to yield an optically active α-enamide which is essentially free of enantiomeric pairs, (3) making an N-acyl-α-amino acid or ester whose α C atom and another C atom are chiral, by hydrocarboxylating said optically active α-enamide with CO and H_2O or an organic hydroxyl compound to produce an N-acyl-α-amino acid or ester, respectively, having essentially no enantiomeric pairs, and containing diastereomeric N-acyl-α-amino acids or esters having two chiral centers, (4) separating the diastereomers by conventional physical means, (5) hydrolyzing each diastereomer to make the L and D α-amino acids, respectively, plus said optically active carboxylic acid, and recycling at least a part of said carboxylic acid (as the acid or after conversion to the halide or anhydride) to step (1),

said hydrocarboxylating simultaneously creating (a) said N-acyl-α-amino acid or ester, (b) the chirality of said alpha C atom in L, D form and (c) the second chiral center in said N-acyl-α-amino acid or ester in essentially all L or all D form.

4,929,756

PROCESS FOR PREPARING OXIMES

Kiyoji Kuma, Kitakyushu, Japan, assignor to Mitsubishi Kasei Corporation, Tokyo, Japan

Filed Jun. 1, 1989, Ser. No. 360,034
Claims priority, application Japan, Jun. 13, 1988, 63-145033
Int. Cl.[5] C07C *131/04*
U.S. Cl. 564—267 12 Claims

1. A process for preparing an oxime, which comprises reacting a ketone or aldehyde selected from the group consisting of cyclohexanone, cyclododecanone, acetone, dimethylacetone, acetophenone, benzophenone, acetaldehyde, propionaldehyde, butylaldehyde, caproic aldehyde, benzaldehyde and anisaldehyde with nitrogen monoxide and hydrogen in the presence of a platinum group metal catalyst selected from the group consisting of platinum, palladium, rhodium, ruthenium, osmium and iridium, and oxides, inorganic acid salts, organic acid salts, sulfides, cyanides and complex salts thereof, at a temperature of 10–150° C., the catalyst being in an amount of 0.001–20 mmol as metal per kg of the reaction solution, the hydrogen being in an amount of at least 1.5 mols per mol of the ketone or aldehyde, and the nitrogen monoxide being in an amount of at least one mol per mol of the ketone or aldehyde.

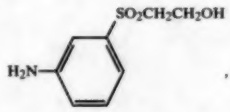
4,929,757

PROCESS FOR THE PREPARATION OF 3-AMINOPHENYL 2-HYDROXY-ETHYL SULPHONE

Karl-Josef Herd, Odenthal, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jun. 17, 1988, Ser. No. 208,349
Claims priority, application Fed. Rep. of Germany, Jun. 17, 1987, 3720213
Int. Cl.[5] C07C *87/48, 147/06, 147/11, 85/11*
U.S. Cl. 564—423 5 Claims

1. A process for the preparation of the sulphone of the formula



wherein 2-chloro-5-nitrobenzenesulphochloride is reacted with sodium sulphite to give 2-chloro-5-nitrobenzenesulphinic acid, the benzenesulphinic acid product is then reacted with ethylene oxide to give 2-chloro-5-nitrophenyl hydroxyethyl sulphone and the latter is then treated with hydrogen in the presence of hydrogenation catalysts to form the sulphone.

4,929,758

PREPARATION OF TERT-BUTYLAMINE FROM ISOBUTENE

Volker Taglieber, Eppelheim; Wolfgang Hoelderich, Frankenthal; Rudolf Kummer, Frankenthal; Wolf D. Mross, Frankenthal, and Guenter Saladin, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Continuation of Ser. No. 908,297, Sep. 17, 1986, abandoned, which is a continuation-in-part of Ser. No. 663,283, Jul. 23, 1984, abandoned. This application Jun. 13, 1988, Ser. No. 212,161
Claims priority, application Fed. Rep. of Germany, Jul. 23, 1983, 3326579
Int. Cl.[5] C07C *85/02, 85/18*
U.S. Cl. 564—485 7 Claims

1. A process for preparing tert-butylamine from isobutene, which comprises the steps of:

(a) reacting isobutene with ammonia, or a primary or secondary amine, or a mixture thereof in the presence of an iron silicate catalyst of the pentasil type at from 250°–350° C. and under 200–300 bar;

(b) isolating the tert-butylamine; and

(c) recycling unreacted starting materials.

4,929,759

PRODUCTION OF AMINES FROM AN OLEFIN AND AMMONIA OR A PRIMARY OR SECONDARY AMINE

Volker Taglieber, Eppelheim; Wolfgang Hoelderich, Frankenthal; Rudolf Kummer, Frankenthal; Wolf D. Mross, Frankenthal, and Guenter Saladin, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Continuation of Ser. No. 273,160, Nov. 18, 1988, abandoned, Continuation of Ser. No. 5,339, Jan. 15, 1987, abandoned, Continuation of Ser. No. 633,281, Jul. 23, 1984, abandoned. This application Oct. 6, 1989, Ser. No. 418,939
Int. Cl.[5] C07C *85/18*
U.S. Cl. 564—485 14 Claims

1. A process for the preparation of an amine from an olefin and ammonia or a primary or secondary amine at from 80° to 400° C. and under from 40 to 700 bar in the presence of a zeolite catalyst, wherein an olefin is reacted with ammonia or a primary or secondary amine, or a mixture of these, in the presence of a borosilicate or borogermanate zeolite of the pentasil type as a catalyst, the resulting amine is isolated and the unreacted starting materials are recycled.

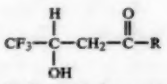
4,929,760

FLUORINE-CONTAINING CARBONYL COMPOUNDS AND METHOD FOR PREPARING THE SAME

Tomoya Kitazume, Tokyo; Takashi Yamazaki, Kanagawa, and Seiten Rin, Tokyo, all of Japan, assignors to Showa Shell Sekiyu Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 19, 1988, Ser. No. 221,371
Claims priority, application Japan, Nov. 24, 1987, 62-294195; Nov. 24, 1987, 62-294196
Int. Cl.[5] C07C *49/167*
U.S. Cl. 568—308 13 Claims

1. Fluorine-containing carbonyl compounds of the formula



wherein R stands for a substituted or not-substituted C_5–C_{10} alkyl group, a substituted or not-substituted aromatic group or a substituted or not-substituted arylalkyl group.

4,929,761

PREPARATION OF SUBSTITUTED BENZOPHENONES

Gregory P. Hussmann, Warrenville, and Carl A. Udovich, Joliet, both of Ill., assignors to Amoco Corporation, Chicago, Ill.

Filed Dec. 22, 1986, Ser. No. 944,515
Int. Cl.[5] C07C *45/48*
U.S. Cl. 568—319 6 Claims

1. A process for preparing a benzophenone from an aromatic carboxylic acid, which process comprises contacting a feed comprising said aromatic carboxylic acid in the vapor phase and at a temperature within the range of from about 250° C. to about 500° C., a pressure within the range of from about 5 psia to about 200 psia and a contact time within the range of about 1 sec to 10 sec with a catalyst selected from the group consisting essentially of Nd_2O_3 and ThO_2/MgO, said MgO in an amount within the range of about 21.5 wt. % to about 75 wt. %, based on sum of weights of ThO_2 and MgO, to convert said aromatic carboxylic acid to a benzophenone.

4,929,762
PROCESS FOR PRODUCING A PHENOL AND/OR A CYCLOHEXANONE

Fujihisa Matsunaga, and Hiroshi Fukuhara, both of Chiba, Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Mar. 2, 1989, Ser. No. 318,117
Claims priority, application Japan, Mar. 7, 1988, 63-53071
Int. Cl.[5] C07C *45/00*
U.S. Cl. 568—361 **6 Claims**

1. A process for producing a phenol, a cyclohexanone or both wherein a cyclohexenone and a cyclohexenol are dehydrogenated in liquid phase under the presence of a solid catalyst comprising a platinum-group metal loaded on a carrier.

4,929,763
ALCOHOL CONVERSION

Melvin L. Luetkens, Jr., Batavia; Steve T. McKenna, Lisle, and John L. Melquist, Naperville, all of Ill., assignors to Amoco Corporation, Chicago, Ill.

Filed Mar. 29, 1989, Ser. No. 330,417
Int. Cl.[5] C07C *45/39*
U.S. Cl. 568—402 **48 Claims**

1. A process for chemical conversion of alcohol to at least one alkene, aldehyde or ketone compound which comprises contacting the alcohol in a fluid phase with a heterogeneous catalyst composition comprising aluminum, boron, oxygen, and at least one transition element selected from the group consisting of Group IIIB of the Periodic Table, the heterogeneous catalyst composition having at lease one X-ray identifiable crystalline phase selected from the group consisting of phase I having an X-ray diffraction pattern comprising significant lines and assigned strengths substantially as follows

Interplanar Spacing d, Angstroms	Assigned Strength
9.15 ± 0.25	Medium–Strong
4.57 ± 0.15	Weak–Medium
3.62 ± 0.10	Very Strong
2.98 ± 0.08	Strong
2.41 ± 0.05	Weak
2.28 ± 0.05	Weak
1.98 ± 0.04	Weak
1.82 ± 0.04	Weak

and phase II having an X-ray diffraction pattern comprising significant lines and assigned strengths substantially as follows

Interplanar Spacing d, Angstroms	Assigned Strength
5.37 ± 0.15	Medium
3.52 ± 0.10	Medium–Strong
2.69 ± 0.08	Very Strong
2.33 ± 0.05	Weak–Medium
2.14 ± 0.05	Weak–Medium
1.79 ± 0.05	Medium
1.67 ± 0.04	Weak–Medium.

4,929,764
ALKYLATION OF AROMATIC AMINES

Duane C. Hargis, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Continuation-in-part of Ser. No. 618,005, Jun. 6, 1984, Pat. No. 4,721,810. This application Sep. 16, 1985, Ser. No. 776,753
Int. Cl.[5] C07C *85/24*
U.S. Cl. 564—399 **15 Claims**

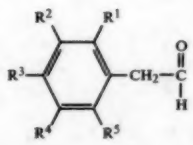
1. A process for alkylating aromatic amines comprising the step of reacting (a) an aromatic amine having at least one replaceable hydrogen atom on a primary amino group and on an aromatic ring carrying such amino group, with (b) a dialkyl ether in which each alkyl group has 2 to 4 carbon atoms, in the presence of a metal oxide alkylation catalyst consisting essentially of titanium dioxide having a surface area below 130 square meters per gram and at a temperature in the range of 300° C. to 400° C. at which alkylation of the aromatic amine occurs and at which the amount of exclusively ring-alkylated product formed exceeds the amount of exclusively N-alkylated product formed.

4,929,765
PREPARATION OF PHENYLACETALDEHYDES

Hubert Smuda, Heidelberg; Wolfgang Hoelderich, Frankenthal; Norbert Goetz, Worms, all of Fed. Rep. of Germany, and Hans-Gert Recker, Irvine, Calif., assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

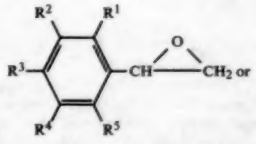
Filed Nov. 22, 1988, Ser. No. 274,930
Claims priority, application Fed. Rep. of Germany, Nov. 27, 1987, 3740270
Int. Cl.[5] C07C *45/67, 45/70*
U.S. Cl. 568—427 **6 Claims**

1. A process for preparing a phenylacetaldehyde of the general formula I

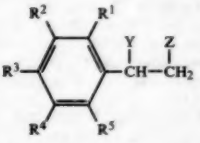


(I)

where R^1 to R^5 are each independently of the others hydrogen, , alkoxy, halogen, haloalkyl, haloalkoxy or haloalkylthio, by catalytic rearrangement in the presence of a zeolite, which comprises reacting an epoxy of the formula II or a phenylglycol of the formula III



(II)



(III)

where Y and Z can be identical to or different from each other and are each hydroxyl, alkoxy, aryloxy or acyloxy, in the gas phase over a borosilicate zeolite catalyst at from 70° to 200° C. under reduced pressure at a residence time over the catalyst of less than 4 seconds.

4,929,766

PROCESS ARE THE PREPARATION OF P-HYDROXY-BENZALDEHYDES

Albert Schnatterer, and Helmut Fiege, both of Leverkusen, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Feb. 16, 1989, Ser. No. 311,481

Claims priority, application Fed. Rep. of Germany, Feb. 24, 1988, 3805697

Int. Cl.[5] **C07C** *45/36*

U.S. Cl. 568—432 **20 Claims**

1. A process for the preparation of p-hydroxybenzaldehydes of the formula

in which

R^1 to R^4 independently of one another denote hydrogen, halogen, C_1–C_{10}-alkyl, C_3–C_8-cycloalkyl, phenyl or C_1–C_{10}-alkoxy,

comprising oxidizing p-cresols of the formula

in which

R^1 to R^4 have the meaning given, with oxygen in the presence of 1–10 equivalents of basic substances per mole of p-cresol in a solvent in the presence of a chelate complex of iron, manganese or iron and manganese wherein the basic substances are metal hydroxides, metal alcoholates or metal amides of alkali metals or alkaline earth metals or alcoholates or amides of aluminum and the reaction is carried out at a temperature of from 0°–200° C.

4,929,767

TREATMENT OF RHODIUM CATALYSTS

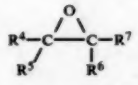
David J. Miller, Charleston; David R. Bryant, South Charleston; Ernst Billig, Charleston, all of W. Va., and Bernard L. Shaw, Leeds, England, assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Continuation-in-part of Ser. No. 231,508, Aug. 12, 1988. This application Oct. 6, 1988, Ser. No. 254,197

Int. Cl.[5] **C07C** *45/50*; **C04B** *35/00*

U.S. Cl. 568—454 **27 Claims**

1. A process for increasing the amount of rhodium capable of being extracted into an aqueous solution containing an ionic organophosphine ligand, which rhodium is present in an organic solution containing a partially deactivated rhodium - tertiary non-ionic organophosphine complex catalyst, said process comprising mixing under non-hydroformylation conditions, said organic solution with an organic reagent selected from the group consisting of (a) alkyne compounds having the formula R—C≡C—CH_2—X, (b) alkene compounds having the formula $(R^1)(R^2)C{=}C(R^3)$—CH_2—X, (c) diketene, (d) methyl halides, (e) methyl sulfonates, (f) propiolate compounds having the formula HC≡C—C(O)OR^{14}, and (g) oxide compounds having the formula



wherein X represents a radical selected from the group consisting of halogen atoms, a hydroxyl radical, a carboxylate radical of the formula —OC(O)R^8, a sulfonate radical of the formula —OSO_2R^8 a phosphonium radical of the formula [—$P^{30}(R^8)_3$][Y—]; wherein R^8 in the above formulae for X, each individually represent a monovalent hydrocarbon radical having from 1 to 18 carbon atoms selected from the group consisting of alkyl, aryl, aralkyl, alkaryl and cycloalkyl radicals and wherein Y represents an acid anion; and wherein each R, R^1, R^2, R^3, R^4, R^5, R^6, R^7, and R^{14} radical individually represents hydrogen or a monovalent hydrocarbon radical having from 1 to 18 carbon atoms selected from the group consisting of alkyl, aryl, alkaryl, aralkyl and cycloalkyl radicals; with the following provisos: that R^8 in the above carboxylate formula can also be hydrogen; that R^2 and R^3 in the above formula for the alkene compounds can also be bonded together to form a five or six membered heterocyclic ring or monocyclic hydrocarbon ring along with the C=C group shown in said formula; and wherein any two of said R^4, R^5, R^6 and R^7 groups in the above formula for the oxides can be bonded together to form a five or six membered monocyclic hydrocarbon ring along with the C—C group shown in said formula; to obtain an organic solution of an organic reagent treated solubilized rhodium - tertiary non-ionic organophosphine complex product that contains more rhodium correspondingly capable of being extracted into an aqueous solution containing an ionic organophosphine ligand than contained in the organic solution starting material of this process.

4,929,768

PROCESS FOR PREPARING DIALDEHYDE

Sumio Nakagawa, Ogaki; Masaoki Toiyama; Yoshinobu Uno, both of Gifu, and Hiromichi Kohda, Hirakata, all of Japan, assignors to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Feb. 16, 1989, Ser. No. 311,253

Claims priority, application Japan, Feb. 19, 1988, 63-37782

Int. Cl.[5] **C07C** *45/29, 45/38*

U.S. Cl. 568—473 **1 Claim**

1. A process for preparing a dialdehyde from a glycol of the formula HO—$(CH_2)_n$—OH, where n is an integer of not less than 2, comprising subjecting the glycol to oxidation-dehydrogenation in the presence of silver particles having a surface partially coated with a powder selected from the group consisting of a silicone carbide powder and a silicone nitride powder, using oxygen or air as the oxidant, the oxidation-dehydrogenation reaction being conducted at a temperature of 300° to 700° C. and at atmospheric pressure.

4,929,769

NOVEL POLYETHER CONTAINING AT LEAST ONE 2-HALOMETHYLOXYETHYLENE UNIT AND 2,3-DIHYDROXYPROPYL END GROUPS

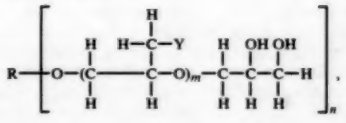
Norman S. Anderson; Albert L. Promislow, both of Charlotte, N.C.; Randy L. Rayborn, Winder, Ga., and Rastko Vukov, Mississauga, Canada, assignors to Hoechst Celanese Corporation, Somerville, N.J. and Alkaril Chemicals, Inc., Ontario, Canada

Filed Apr. 28, 1989, Ser. No. 344,598

Int. Cl.[5] **C07C** *43/11*

U.S. Cl. 568—614 **41 Claims**

1. A halogenated polyether containing at least one 2-halomethyloxyethylene unit and 2,3-dihydroxypropyl end groups in the substantial absence of epoxy groups which exhibits the following structural formula:



where R is the residual portion of an etherified organic polyhydroxy compound; n is 2 to 8 and designates the number of ether chains extending from R; m is 0 to 7 and designates the number of the illustrated Y-substituted methyloxyethylene units present in each ether chain; Y is selected from the group consisting of hydroxy, chlorine, bromine, iodine, and mixtures of the foregoing; the sum of all of the illustrated Y-substituted methyloxyethylene units in the overall molecule is 1 to 25; and Y must be chlorine, bromine, and/or iodine in at least a portion of the overall molecule, with the proviso that when bromine and iodine are absent in Y there must be at least two 2-chloromethyloxyethylene units in the overall molecule, and when bromine or iodine are present in Y there must be at least one 2-bromoethyloxyethylene or 2-iodomethyloxyethylene unit in the overall molecule.

4,929,770

ALUMINUM PHENOXIDE CATALYST REMOVAL

Charles W. Matthews, Orangeburg, S.C.; Eric S. Batman, Belleville, Ill., and Jeffrey F. King, Orangeburg, S.C., assignors to Ethyl Corporation, Richmond, Va.

Filed Mar. 8, 1989, Ser. No. 320,540

Int. Cl.[5] **C07C** *37/70, 37/74*

U.S. Cl. 568—756 **5 Claims**

1. A method of removing aluminum phenoxide catalyst from a phenol alkylation mixture containing 15–450 moles of phenolic compound per mole of aluminum phenoxide, said method comprising:

(A) adding about 15–30 moles of water per mole of aluminum phenoxide to the phenol alkylation mixture to obtain a wet alkylation mixture,

(B) maintaining said wet alkylation mixture at about 30°–100° C. for about 5–120 minutes and then,

(C) maintaining the wet alkylation mixture at a temperature of 120°–160° C. while distilling out water until filterable solid particulates form and,

(D) removing said solid particulates from said alkylation mixture.

4,929,771

PROCESS FOR THE PREPARATION OF ALKYL-SUBSTITUTED PHENOLS OR NAPHTHOLS

Martin Clausen; Paul Rys, and Wang Junkuan, all of Zurich, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Dec. 1, 1988, Ser. No. 278,396

Claims priority, application Switzerland, Dec. 9, 1987, 4800/87

Int. Cl.[5] **C07C** *37/08*

U.S. Cl. 568—798 **9 Claims**

1. A process for the preparation of compounds of the formula

(I) HO - Ar - R,

in which Ar is substituted or unsubstituted phenylene or naphthalene and R is C_1–C_5alkyl, which comprises oxidizing dialkylaryl compounds of the formula

in which R_1 and R_2 independently of one another are C_1–C_5alkyl, but are not simultaneously methyl or C_5alkyl, and Ar is as defined above in the absence of solvents, at temperatures from 70° to 130° C. by means of oxygen or oxygen donors in the presence of an alkali metal salt or alkaline earth metal salt of an organic carboxylic acid having 5 to 14 carbon atoms, to give the corresponding dialkylaryl monohydroperoxides and then hydrolysing the latter under acidic conditions to give the compounds of the formula (I).

4,929,772

PROCESS FOR PREPARING POLYHALOGENATED CARBINOLS

Pietro Massardo, Milan; Franco Bettarini, Novara; Paolo Piccardi, Milan, and Franco Rama, Varese, all of Italy, assignors to Istituto Guido Donegani, Milan, Italy

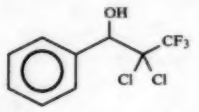
Division of Ser. No. 205,506, Jun. 7, 1988, abandoned, which is a continuation of Ser. No. 71,540, Jul. 7, 1987, abandoned, which is a continuation of Ser. No. 817,542, Jan. 10, 1986, abandoned. This application Mar. 9, 1989, Ser. No. 321,171

Claims priority, application Italy, Jan. 11, 1985, 19080 A/85

Int. Cl.[5] **C07C** *33/46*

U.S. Cl. 568—812 **1 Claim**

1. A polyhalogenated carbinol of the formula:



4,929,773

METHOD OF PRODUCING 1-(4'-ISOBUTYLPHENYL)ETHANOL

Debra A. Ryan, Corpus Christi, Tex., assignor to Hoechst Celanese Corporation, Somerville, N.J.

Filed Sep. 7, 1988, Ser. No. 242,082

Int. Cl.[5] **C07C** *29/14, 29/132*

U.S. Cl. 568—814 **9 Claims**

1. A method of producing 1-(4'-isobutylphenyl)ethanol (IBPE) comprising hydrogenating 4-isobutylacetophenone (IBAP) with hydrogen in the absence of a solvent using a treated activated sponge nickel catalyst obtained by subjecting such a catalyst wetted with a protective liquid composed preponderantly of water to a washing treatment with an organic washing liquid in which the aqueous protective liquid is substantially soluble, such washing liquid being substantially soluble in IBAP or IBPE.

4,929,774

STABLE MIXTURE CONTAINING OXIDATION-SENSITIVE COMPOUNDS, PREPARATION THEREOF AND USE OF A COMBINATION OF SUBSTANCES FOR STABILIZING OXIDATION-SENSITIVE COMPOUNDS

Chiharu Fukamachi, Uedashi, Japan; Horst Schumacher, Bobenheim am Berg, Fed. Rep. of Germany; Wolfgang Bewert, Frankenthal, Fed. Rep. of Germany, and Joachim Schneider, Weisenheim am Berg, Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jan. 27, 1989, Ser. No. 302,611

Int. Cl.[5] **C07C** *35/18*

U.S. Cl. 568—824 **16 Claims**

1. A stable mixture containing an oxidation-sensitive compound selected from the group consisting of a fat-soluble vitamin and a carotenoid, a triglyceride, a complexing agent selected from the group consisting of phytic acid, phosphoric acid, meta-, pyro- or polyphosphoric acid and a salt thereof, and a coating substance.

4,929,775

PROCESS FOR PREPARING BROMINATED PENTAERYTHRITOLS

Saadat Hussain, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed May 30, 1989, Ser. No. 358,591
Int. Cl.[5] C07C 31/36, 31/42
U.S. Cl. 568—844 7 Claims

1. A process for preparing a product predominate in brominated pentaerythritols, which process comprises:

(a) charging a vessel with pentaerythritol, a first portion of aqueous HBr and a catalyst selected from the group consisting of mono- or di-carboxylic acids, their anhydrides, their esters and mixtures of two or more of such acids, anhydrides and esters;

(b) after (a), maintaining the liquid contents of the vessel at a temperature within the range of from about 80° C. to about 130° C. for period within the range of from about 1 to about 3 hours;

(c) after (b), adding a second portion of aqueous HBr to the vessel over a period of from about 0.5 to about 2 hours while maintaining the liquid contents of the vessel at a temperature within the range of from about 80° C. to about 130° C., the first portion and the second portion providing a mole ratio of pentaerythritol to HBr which is within the range of from about 1:3 to about 1:6;

(d) after the addition of the second portion of aqueous HBr is at least substantially complete, raising the temperature of the liquid contents of the vessel to a temperature within the range of from about 120° C. to about 180° C. and maintaining such temperature for a period of at least 0.5 hours; and

(e) during at least steps (b), (c), and (d), sweeping the headspace of the vessel with an inert gas and removing from the vessel the sweep gas and any vapors formed during the process.

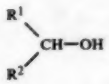
4,929,776

PROCESS FOR THE PREPARATION OF UNSATURATED ALCOHOLS

Jean-Michel Grosselin, and Claude Mercier, both of Lyon, France, assignors to Rhone-Poulenc Sante, Antony, France

Filed Nov. 29, 1988, Ser. No. 277,306
Claims priority, application France, Dec. 1, 1987, 87 16628
The portion of the term of this patent subsequent to May 15, 2007, has been disclaimed.
Int. Cl.[5] C07C 29/14, 27/04
U.S. Cl. 568—862 10 Claims

1. A process for the preparation of an unsaturated alcohol of the formula:



in which each of R^1 and R^2, which are identical or different, represents a hydrogen atom, a saturated or unsaturated aliphatic radical of 1 to 30 carbon atoms, a saturated or unsaturated aliphatic radical of 1 to 30 carbon atoms substituted by a saturated or unsaturated alicyclic radical of 5 or 6 carbon atoms by a phenyl radical, a saturated or unsaturated alicyclic radical of 5 or 6 carbon atoms or a phenyl radical, at least one of the radicals R^1 and R^2 containing an ethylenic double bond, or R^1 and R^2 together form an ethylenically unsaturated alicyclic radical of 5 or 6 carbon atoms, each of the aforesaid aliphatic, alicyclic or phenyl radicals being unsubstituted or substituted by one or more identical or different alkyl radicals of 1 to 4 carbon atoms, which comprises hydrogenating a carbonyl compound of the formula:

in which R^1 and R^2 are as defined above, in a homogeneous liquid medium with hydrogen in the presence of a neutral ruthenium-based catalyst."

4,929,777

CATALYST COMPOSITIONS AND THE USE THEREOF IN THE HYDROGENATION OF CARBOXYLIC ACID ESTERS

Gether Irick, Jr., Gray; Patricia N. Mercer, Kingsport, and Kenneth E. Simmons, Blountville, all of Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 13, 1989, Ser. No. 309,641
Int. Cl.[5] C07C 27/04
U.S. Cl. 568—864 17 Claims

1. A process for hydrogenating an ester of an aliphatic or cycloaliphatic carboxylic acid to obtain the alcohol corresponding to the acid residue of the ester which comprises contacting the ester with hydrogen in the presence of catalyst comprising as the essential ingredient chemically-mixed, copper-titanium oxide under hydrogenation conditions of temperature and pressure.

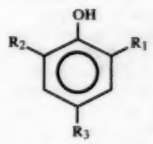
4,929,778

METHODS AND COMPOSITIONS FOR INHIBITING STYRENE POLYMERIZATION

Paul V. Roling, Spring, Tex., assignor to Betz Laboratories, Inc., Trevose, Pa.

Filed Jun. 5, 1989, Ser. No. 361,170
Int. Cl.[5] C07C 7/20
U.S. Cl. 585—3 30 Claims

1. A method of inhibiting polymerization of a vinyl aromatic compound monomer comprising adding to the vinyl aromatic compound monomer an effective inhibiting amount of (a) a phenylenediamine compound having at least one N—H bond therein, and (b) a hindered phenol having the structure



wherein R_1 and R_2 may be the same or different, with R_1 and R_2 being independently chosen and selected from the group of C_1–C_{20} alkyl, C_1–C_{30} alkaryl, and substituted C_1–C_{30} alkaryl; R_3 is selected from the group of C_1–C_{20} alkyl, thiophenol, substituted thiophenol, C_1–C_{40} alkanoic acid ester, C_1–C_{30} alkaryl, substituted C_1–C_{30} alkaryl, C_1–C_6 alkylamino, C_1–C_6 alkoxy, amine, polynuclear aryl and substituted polynuclear aryl.

18. Vinyl aromatic monomer anti-polymerization composition as recited in claim 17 wherein (a) comprises N-phenyl-N'-(1,4-dimethylpentyl)-p-phenylenediamine.

4,929,779

METHOD AND COMPOSITIONS FOR CONTROLLING THE PEAR LEAF BLISTER MOTH, *LEUCOPTERA SCITELLA*

Wittko Francke, Reinbek, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Division of Ser. No. 45,453, May 4, 1987, Pat. No. 4,853,217. This application Jan. 26, 1989, Ser. No. 301,946

Claims priority, application Fed. Rep. of Germany, May 10, 1986, 3615854

Int. Cl.[5] C07C *9/00*

U.S. Cl. 585—16 **2 Claims**

1. Racemic 5,9-dimethylheptadecane.

2. 5,9-dimethylheptadecane free from other substances indigenous to the pear leaf blister moth, *Leucoptera scitella.*

4,929,780

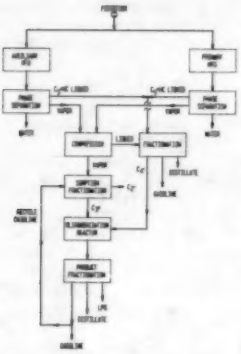
MULTISTAGE PROCESS FOR CONVERTING OXYGENATES TO LIQUID HYDROCARBONS AND ETHENE

Bernard S. Wright, East Windsor; Ronald M. Gould, Sewell, and Hartley Owen, Belle Mead, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed May 12, 1988, Ser. No. 861,820

Int. Cl.[5] C07C *1/20*

U.S. Cl. 585—303 **11 Claims**



1. An integrated continuous process for converting oxygenated organic feedstock to liquid hydrocarbons and ethene, comprising the steps of:

reacting a major portion of feedstock comprising lower aliphatic oxygenate in a continuous primary conversion unit comprising a low pressure fluidized bed reactor containing zeolite oxygenate conversion catalyst to dehydrate and convert at least a portion of the feedstock to hydrocarbons containing a major fraction of C_2–C_4 olefins having less than 10% by weight ethene and a minor fraction of C_5+ heavy hydrocarbons;

intermittently reacting a minor portion of the lower aliphatic oxygenate feedstock in the presence of a diluent under partial conversion conditions to convert about 25 to 90% of feedstock per pass in an auxiliary conversion unit comprising a low pressure fixed bed reactor containing an acidic zeolite catalyst to dehydrate and convert at least a portion of the feedstock to hydrocarbons containing a major fraction of C_2–C_4 olefins having at least 15% by weight ethene and a minor fraction of C_5+ heavy hydrocarbons, thereby increasing ethene production;

cooling and separating reactor effluent from the primary conversion unit to provide an aqueous liquid stream, a heavy hydrocarbon liquid stream, and recovering a primary light hydrocarbon vapor stream rich in C_2–C_4 olefins;

cooling and separating reactor effluent from the auxiliary conversion unit to provide an aqueous liquid stream, a heavy hydrocarbon liquid stream, and recovering an auxiliary light hydrocarbon vapor stream rich in ethene;

combining the primary and auxiliary light hydrocarbon vapor streams, compressing and selectively sorbing C_3+ vapor hydrocarbons in a gasoline sorbent stream to recover an ethene-rich vapor stream and a liquid stream rich in C_3+ sorbate; and

contacting the sorbate-rich streams in a reaction zone with a shape selective medium pore zeolite oligomerization catalyst at elevated temperature and pressure to convert olefins to an oligomerization effluent stream comprising olefinic gasoline and distilled range liquids.

4,929,781

PROCESS FOR THE SIMULTANEOUS HYDROCONVERSION OF A FIRST FEEDSTOCK COMPRISING UNSATURATED, HALOGENATED ORGANIC COMPOUNDS AND A SECOND FEEDSTOCK COMPRISING SATURATED, HALOGENATED ORGANIC COMPOUNDS

Robert B. James, Jr., Northbrook, and Tom N. Kalnes, La Grange, both of Ill., assignors to UOP, Des Plaines, Ill.

Filed Nov. 30, 1988, Ser. No. 277,743

The portion of the term of this patent subsequent to Feb. 6, 2007, has been disclaimed.

Int. Cl.[5] C10C *1/00*

U.S. Cl. 585—310 **17 Claims**

1. A process for the simultaneous hydrodehalogenation of a first feedstock comprising unsaturated, halogenated organic compounds and a second feedstock comprising saturated, halogenated organic compounds which process comprises:

(a) contacting said first feedstock comprising unsaturated, halogenated organic compounds with hydrogen in a first hydrogenation reaction zone operated at hydrogenation conditions selected to minimize the polymerization of unsaturated organic compounds and to produce a first hydrogenated hydrocarbonaceous stream;

(b) contacting at least a portion of said first hydrogenated hydrocarbonaceous stream and said second feedstock comprising saturated, halogenated organic compounds with hydrogen in a second hydrogenation reaction zone operated at hydrogenation conditions selected to produce a second hydrogenated hydrocarbonaceous stream and to generate at least one water-soluble hydrogen halide compound;

(c) contacting the resulting effluent from said second hydrogenation zone containing hydrogenated hydrocarbonaceous compounds, a hydrogen-rich gas and at least one water-soluble hydrogen halide compound with a halide-lean absorber solution in an absorption zone;

(d) withdrawing a halide-rich absorber solution containing at least a portion of said water-soluble hydrogen halide compound from said absorption zone;

(e) withdrawing a stream comprising hydrogenated hydrocarbonaceous compounds and a hydrogen-rich gas from said absorption zone; and

(f) introducing said stream recovered in step (e) into a separation zone to provide a hydrogen-rich gaseous stream and a third hydrogenated hydrocarbonaceous stream.

4,929,782

LUBRICANTS COMPRISING NOVEL CYCLOPENTANES, CYCLOPENTADIENES, CYCLOPENTENES, AND MIXTURES THEREOF AND METHODS OF MANUFACTURE

Clifford G. Venier, and Edward W. Casserly, both of The Woodlands, Tex., assignors to Pennzoil Products Company, Houston, Tex.

Continuation of Ser. No. 170,653, Mar. 15, 1988, abandoned, which is a division of Ser. No. 112,378, Oct. 22, 1987, Pat. No. 4,849,566, which is a continuation-in-part of Ser. No. 909,305, Sep. 19, 1986, Pat. No. 4,721,823. This application Mar. 15, 1989, Ser. No. 323,164

Int. Cl.[5] **C07C** *2/86*

U.S. Cl. 585—375 **8 Claims**

1. A method for the production of a hydrocarbylated cyclopentadiene which comprises reaction of a hydrocarbyl-substituted or hydrocarbyl-unsusbtituted cyclopentadiene starting material with a molar excess of at least 3:1 of at least one primary or secondary alcohol of the formula:

R_2OH

wherein R_2 is individually and independently selected from the group consisting of hydrocarbyl groups of 4 to 36 carbon atoms, the reaction being conducted in the presence of a basic catalyst and in closed vessel at temperatures ranging from about 180° to 300° C., by addition of the cyclopentadiene starting material to a reaction vessel containing the basic catalyst in a solution of said alcohol, heating the reaction vessel while removing water from the reaction mixture as it is formed during the reaction, and recovering the hydrocarbylated cyclopentadiene which contains at least one more hydrocarbyl substituent than the cyclopentadiene starting material.

4,929,783

COUPLING PROCESS

R. Scott Smith, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Continuation-in-part of Ser. No. 276,532, Nov. 28, 1988, abandoned. This application Jun. 27, 1989, Ser. No. 372,272

Int. Cl.[5] **C07C** *2/64, 15/067*

U.S. Cl. 585—452 **14 Claims**

1. In a process for coupling an alkene selected from ethene, propene, and mixtures thereof with an aromatic hydrocarbon having an active hydrogen on a saturated alpha-carbon in the presence of a supported potassium or potassium alloy as a catalyst, the improvement which comprises conducting the reaction in the presence of an alkaline earth metal oxide as a co-catalyst, the catalyst composition containing about 200–1500 weight % of support and about 4–40 mol % of co-catalyst, based on the amount of potassium or potassium alloy.

4,929,784

PROCESS FOR THE PREPARATION OF OPTIONALLY SUBSTITUTED BENZYL-BENZENES

Kurt Klinkmann, Nettersheim; Michael Herzhoff, Much, and Gerhard Burmeister, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

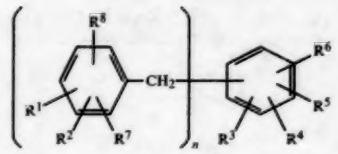
Filed Oct. 11, 1989, Ser. No. 419,994

Claims priority, application Fed. Rep. of Germany, Oct. 28, 1988, 3836780

Int. Cl.[5] **C07C** *2/02*

U.S. Cl. 585—422 **11 Claims**

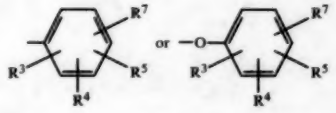
1. A process for the preparation of benzyl-benzenes of the formula



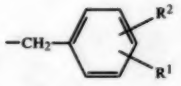
in which

R^1, R^2, R^3, R^4 and R^5 independently of one another denote hydrogen, C_1–C_4-alkyl, C_1–C_4-alkoxy, fluorine or chlorine, where R^1, R^2, R^3 and R^4 independently of one another may also represent hydroxyl and R^5 may additionally be C_5–C_8-alkyl,

R^6 represents hydrogen or one of the groups

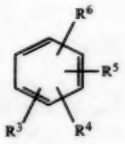


R^7 represents hydrogen or the group

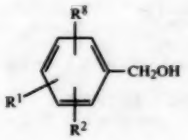


n represents the number 1 or 2 and may also represent the number 3 in the case in which one of the radicals R^3, R^4, R^5 or R^6 denotes hydrogen,

wherein a benzene of the formula



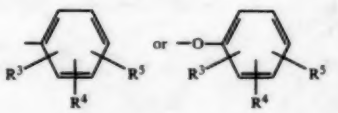
is reacted with a benzyl alcohol of the formula



where

R^1 to R^5 have the abovementioned meaning,

R^6 represents hydrogen or one of the groups



and

R^8 denotes hydrogen or hydroxymethyl,

in a ratio of 1 mole of benzene to 0.5–5 moles of benzyl alcohol in the presence of an amount of activated bleaching earth of 0.05–5% by weight, relative to the amount of benzyl alcohol, at a temperature between 90° C. and 140° C. in the presence of a diluent.

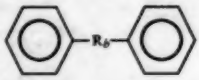
4,929,785

PROCESS FOR PREPARING DIPHENYLALKANE

Saadat Hussain, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed Mar. 20, 1989, Ser. No. 326,096
Int. Cl.[5] C07C 2/02, 2/72, 1/20
U.S. Cl. 585—426 21 Claims

1. A process for preparing diphenylalkanes of the formula,



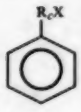
wherein R is a methylene group and b is 2, 4, 6, 8, or 10, which process comprises:

(a) forming a reaction mass which initially contains,

(i) iron,

(ii) a catalytic quantity of copper, a Cu(I) salt of an inorganic or organic acid or a mixture of copper and said Cu(I) salt,

(iii) a phenylalkylhalide of the formula,



wherein R is a methylene group, c=½ b and X is a halide radical,

(iv) a solvent in which Fe(II) halide is substantially soluble, and

(b) maintaining said reaction mass at a temperature of at least 40° C. until said diphenylalkane is formed.

4,929,786

PREPARATION OF 1-ARYL-1-ALKENES

Walter Himmele, Walldorf; Kaspar Bott, Mannheim, and Klaus Bronstert, Carlsberg, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Oct. 28, 1988, Ser. No. 264,081
Claims priority, application Fed. Rep. of Germany, Oct. 30, 1987, 3736819
Int. Cl.[5] C07C 1/20
U.S. Cl. 585—469 5 Claims

1. A process for the preparation of a 1-aryl-1-alkene, the process comprising dehydrating a 1-aryl-1-alkanol in the presence of a substance promoting elimination of water wherein said substance is a triester of phosphorous acid of the general formula (III)

$$R^4O—P(OR^5)—OR^6 \quad \text{(III)}$$

wherein R^4, R^5, and R^6 are identical or different aryl, alkyl of from 1 to 20 carbon atoms, arylalkyl of from 7 to 20 carbon atoms, or cycloalkyl of from 3 to 8 carbon atoms, provided that at least one of R^4, R^5 and R^6 is aryl.

4,929,787

PROCESS FOR CONVERGING METHANE TO HIGHER HYDROCARBONS

Charles Cameron, Paris; Hubert Mimoun, Rueil Malmaison; Serge Bounaudet, Paris, and Alain Robine, Rueil Malmaison, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

Filed Aug. 4, 1988, Ser. No. 228,341
Claims priority, application France, Aug. 5, 1987, 87 11183; Nov. 27, 1987, 87 16614
Int. Cl.[5] C07C 2/00, 5/00
U.S. Cl. 585—500 20 Claims

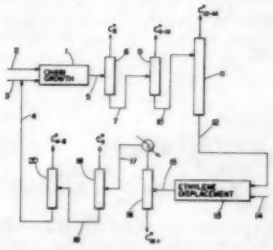
1. A process for converting methane to higher hydrocarbons comprising contacting at conversion conditions a mixture of methane- and oxygen-containing gas with a solid contact mass containing at least one rare-earth metal carbonate wherein the rare-earth metal is lanthanum, neodymium or samarium, and wherein the conversion conditions are such that the carbonate remains essentially carbonate during the conversion.

4,929,788

PROCESS FOR SEPARATING 1-DODECENE AND 1-TETRADECENE FROM AN ALUMINUM ALKYL CHAIN GROWTH PRODUCT

C. S. Warren Huang, Chesterfield, Mo., and Karl W. Meyer, Webster, Tex., assignors to Ethyl Corporation, Richmond, Va.

Filed May 1, 1989, Ser. No. 345,699
Int. Cl.[5] B01D 3/00; C07C 7/04
U.S. Cl. 585—522 8 Claims



1. A process for separating an aluminum alkyl chain growth product comprising C_{12-14} α-olefins including 1-dodecene and 1-tetradecene and triethyl aluminum said process comprising:

(A) feeding said chain growth product to an intermediate point of a rectification column, said rectification column being maintained under vacuum such that in operation the rectification section at said intermediate point is at a temperature in the range of 250°–260° F. and the overhead temperature is about 190°–240° F. whereby triethyl aluminum entering said rectification section is in the form of triethyl aluminum dimer thereby increasing its molecular weight and decreasing its volatility,

(B) distilling at least 10 weight percent of said C_{12-14} α-olefins in the feed mixture overhead from said rectification section and

(C) removing over 50 weight percent of said triethyl aluminum in the feed mixture as a bottoms stream from said rectification column.

8. An aluminum alkyl chain growth process comprising:

(A) feeding ethylene, triethyl aluminum and a recycle stream comprising triethyl aluminum and C_{10-14} α-olefins to an ethylene chain growth reactor, said ethylene, triethyl aluminum and recycle stream being in proportion such that the ethylene:triethyl aluminum mole ratio is about 4–10:1, to obtain a chain growth product,

(B) flashing ethylene and C_{4-10} α-olefins from said chain growth product to obtain a topped chain growth product comprising C_{12-20} α-olefins including 1-dodecene and

1-tetradecene, triethyl aluminum and tri-C_{4-20} alkyl aluminum,

(C) feeding said topped chain growth product to an intermediate point in a rectification column, said rectification column being maintained such that the temperature at said intermediate point is about 250°–260° F. and the overhead temperature is about 190°–240° F. and under vacuum sufficient to cause at least 10 weight percent of said 1-dodecene and 1-tetradecene to distill overhead resulting in a bottoms stream comprising C_{14-20} α-olefins, triethyl aluminum and a mixture of tri-C_{4-20} alkyl aluminums,

(D) feeding said bottoms stream and ethylene to an ethylene displacement reactor to obtain a displacement product comprising ethylene, C_{4-20} α-olefins, triethyl aluminum and minor amounts of higher alkyl aluminums,

(E) separating ethylene from said displacement product,

(F) distilling C_{4-8} olefins from said displacement product to obtain a bottoms stream comprising triethyl aluminum and C_{10-14} α-olefins and

(G) recycling said bottoms stream from (F) to said chain growth reactor in step (A).

4,929,789

PROCESS FOR PYROLYZING OR THERMAL CRACKING A GASEOUS OR VAPORIZED HYDROCARBON FEEDSTOCK USING A NOVEL GAS-SOLIDS CONTACTING DEVICE AND AN OXIDATION CATALYST

Victor R. Gupta, Cleveland Hts., and Christopher J. Clark, Aurora, both of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Filed Jan. 15, 1988, Ser. No. 144,545

Int. Cl.[5] C07C *4/04*

U.S. Cl. 585—648 **29 Claims**

1. A process for converting a gaseous or vaporized hydrocarbon feedstock to a product comprising ethylene, acetylene or a mixture thereof, the process comprising:

advancing a gaseous or vaporous stream comprising a gaseous or vaporous fuel and an oxygen source into contact with particulate solids in one section of an annular gas-solids contacting zone, said stream being deflected at the entrance to said one section of said contacting zone sufficiently to move said solids in a generally circumferential and horizontal direction, said particulate solids being at a sufficiently high temperature to effect combustion of said fuel, said particulate solids comprising an effective amount of at least one oxidation catalyst to enhance the combustion of said fuel, combusting said fuel, the heat from said combustion heating said solid and removing a gaseous or vaporous material comprising exhaust gases or vapor from said combustion from said one section of said contacting zone;

moving said particulate solids to another section of said contacting zone to effect contact between said solids and said feedstock, the movement of said solids being effected by the flow of said gaseous stream;

advancing said feedstock into said another section of said annular contacting zone into contact with said particulate solids, said feedstock being deflected at the entrance to said another section of said contacting zone sufficiently to move said solids in a generally circumferential and horizontal direction, converting at least part of said feedstock to said product, and removing said product from said another section of said contacting zone; and

returning said particulate solids to said one section of said contacting zone.

4,929,790

CATALYTIC CONVERSION OF PROPANE TO ETHYLENE OVER ZSM-23

Warren W. Kaeding, Lawrenceville, N.J., and Ernest W. Valyocsik, Yardley, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 784,966, Oct. 7, 1985, abandoned. This application Jul. 7, 1988, Ser. No. 217,112

Int. Cl.[5] C07C *4/06*

U.S. Cl. 585—651 **13 Claims**

1. A process for converting propane to ethylene, said process comprising contacting said propane with a catalyst comprising a crystalline aluminosilicate zeolite ZSM-23 having x-ray diffraction pattern as set forth in Table 1 under conditions sufficient to effect said propane to ethylene conversion.

4,929,791

CATALYTIC CONVERSION OF PROPANE TO ETHYLENE OVER ZSM-50

Warren W. Kaeding, Lawrenceville, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 784,967, Oct. 7, 1985, abandoned. This application Jul. 7, 1988, Ser. No. 217,111

Int. Cl.[5] C07C *4/06*

U.S. Cl. 585—651 **7 Claims**

1. A process for converting propane to ethylene, said process comprising contacting said propane with a catalyst comprising a crystalline aluminosilicate zeolite ZSM-50 having x-ray diffraction pattern as set forth in Table 1 under conditions sufficient to effect said propane to ethylene conversion.

4,929,792

DEHYDROGENATION, DEHYDROCYCLIZATION AND REFORMING CATALYST

Ralph M. Dessau, Edison, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 283,779, Dec. 13, 1988, Pat. No. 4,867,864. This application Aug. 3, 1989, Ser. No. 389,214

Int. Cl.[5] C07C *5/333*

U.S. Cl. 585—661 **12 Claims**

1. A process for altering the hydrogen content of a C_2–C_{12} paraffin containing feed, comprising contacting the feed with a non-acidic catalyst composition under conditions effective to alter the hydrogen content of said feed, wherein the non-acidic catalyst comprises a dehydrogenation/hydrogenation metal and zeolite beta in non-acidic form;

altering the hydrogen content of said feed and recovering the altered feed.

4,929,793

PRODUCTION OF MIDDLE DISTILLATES BY PARAFFIN DISPROPORTIONATION

Roger A. Morrison, Deptford, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Oct. 21, 1988, Ser. No. 260,636

Int. Cl.[5] C07C *6/08*

U.S. Cl. 585—708 **9 Claims**

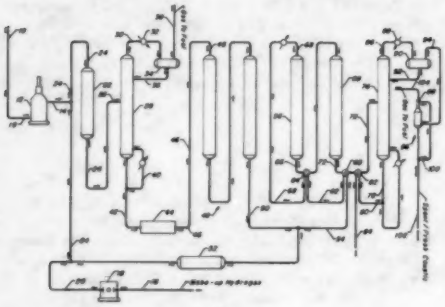
1. A process for producing distillate range products by disproportionating a C_5 to C_8 paraffinic feedstream boiling below the distillate boiling range in the presence of an acidic, solid, porous catalyst comprising an intermediate pore size zeolite at a pressure from 50 to 100 psig and recovering a paraffinic distillate range product.

4,929,794

HYDROTHREATMENT-ISOMERIZATION WITHOUT HYDROGEN RECYCLE

Robert J. Schmidt, and Robert S. Haizmann, both of Rolling Meadows, Ill., assignors to UOP, Des Plaines, Ill.

Filed Dec. 30, 1988, Ser. No. 292,034
Int. Cl.[5] C07C *5/13*
U.S. Cl. 585—737 **11 Claims**



1. A method of supplying hydrogen to a combined hydrotreatment and isomerization process, said method comprising:

(a) forming a hydrotreater feed by combining a hydrocarbon feedstock comprising C_4–C_7 hydrocarbons, and including sulfur and oxygen-containing hydrocarbon compounds, with a first hydrogen containing stream to produce a hydrogen to hydrocarbon ratio of from 0.2 to 0.9 $stdm^3/m^3$ (10 to 50 SCFB) in said hydrotreater feed;

(b) contacting said hydrotreater feed in a hydrotreater reactor with a catalyst comprising a Group VIB metal and a Group VIII metal on an alumina support at conditions including a temperature in the range of 200°–350° C., a pressure of from 700 to 5600 kPa and a liquid hourly space velocity of from 1 to 20 to convert said sulfur and oxygen-containing compounds to hydrocarbons, hydrogen sulfide and water;

(c) recovering a hydrotreater effluent from said hydrotreater reactor;

(d) passing said hydrotreater effluent to a first separator, and separating said effluent into a first gas stream comprising hydrogen, hydrogen sulfide, and water and a treated stream comprising hydrocarbons having from 4–7 carbon atoms;

(e) rejecting said first gas stream from said process;

(f) forming an isomerization feed by combining said treated stream with a second hydrogen-containing stream in a proportion that produces a hydrogen to hydrocarbon ratio of from 0.9 to 1.8 $stdm^3/m^3$ (50 to 100 SCFB);

(g) contacting said isomerization feed in an isomerization reaction zone with an isomerization catalyst comprising alumina, having from 0.01 to 0.25 wt.% platinum and from 2 to 10 wt.% of a chloride component at isomerization conditions including a temperature in a range of from 40°–235° C., a pressure of from 700 to 7000 kPa and a space velocity of from 0.1 to 10;

(h) maintaining a chloride concentration in said isomerization reaction zone of from 30 to 300 ppm;

(i) recovering a second effluent stream from said isomerization reaction zone; and

(j) separating said second effluent stream in a stabilizer column into a product stream, C_4–C_7 hydrocarbons and a second gas stream which is removed from the process.

4,929,795

METHOD FOR ISOMERIZING WAX TO LUBE BASE OILS USING AN ISOMERIZATION CATALYST

Ian A. Cody, Clearwater, Canada; Glen P. Hamner, deceased, late of Baton Rouge (by Annabelle Hamner, executrix), and James T. Schorfheide, Baton Rouge, both of La., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Continuation-in-part of Ser. No. 134,952, Dec. 8, 1987, abandoned. This application Dec. 13, 1988, Ser. No. 283,665
Int. Cl.[5] C07C *15/13*
U.S. Cl. 585—739 **12 Claims**

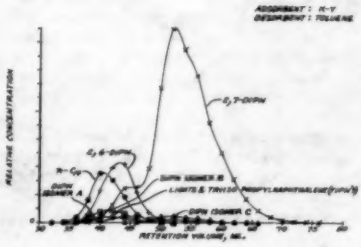
1. An improved method for producing lube oil base stocks or blending stocks by the catalytic isomerization of wax under typical isomerization conditions, said improvements comprising using a hydrogenation metal loaded fluorided alumina or material containing alumina catalyst which catalyst as introduced to waxy feed is characterized by possessing (1) a hydrate level of 60 or less determined as the relative amount of hydrate represented by a peak in the X-ray diffraction (XRD) pattern at $2\theta = 5.66$ Å when a hydrate level of 100 corresponds to the $2\theta = 5.66$ Å peak heigh; exhibited in the XRD by a standard material constituting 0.6 wt% Pt on 150 m^2/g γ alumina containing 7.2 wt% fluorine wherein the fluorine has been deposited using an aqueous solution containing a high concentration of HF and the material dried at 150° C. for 16 hours; (2) a surface nitrogen content N/Al ratio of 0.01 or less as determined by X-ray photo electron spectroscopy; (3) a bulk fluorine concentration of between 2 to 10 wt% and (4) a surface fluorine concentration defined as the amount of fluorine present in a layer between the surface of the catalyst to a depth of about 1/100 inch of less than about 3 wt% provided that the surface fluoride concentration is less than the bulk fluoride concentration.

4,929,796

SEPARATION OF 2,7 DIISOPROPYLNAPHTHALENE FROM A FEED MIXTURE COMPRISING VARIOUS DIISOPROPYLNAPHTHALENE ISOMERS WITH A ZEOLITE ADSORBENT

Timothy J. Barder, Addison, Ill., assignor to UOP, Des Plaines, Ill.

Filed Mar. 10, 1989, Ser. No. 322,329
Int. Cl.[5] C07C *7/12*
U.S. Cl. 585—828 **12 Claims**

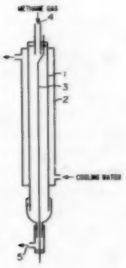


1. A process for separating 2,7 DIPN from a feed mixture comprising, 2,7 DIPN and at least one other DIPN isomer, which process comprises contacting, at adsorption conditions, said feed with an adsorbent comprising a Y zeolite which has been at least partially exchanged at exchangeable sites, with potassium cations, to effect the adsorption of 2,7 DIPN and thereafter recovering the 2,7 DIPN.

4,929,797
METHOD FOR PRODUCING HYDROCARBONS HAVING TWO CARBON ATOMS

Tatsuaki Yamaguchi, Tokyo, and Kozo Hirota, Chiba, both of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan

Filed Nov. 14, 1988, Ser. No. 270,638
Claims priority, application Japan, Nov. 14, 1987, 62-287656
Int. Cl.[5] C07C 2/00
U.S. Cl. 585—921 4 Claims



1. A method for producing hydrocarbons having two carbon atoms, which comprises introducing methane gas into a reactor downwardly from the top, said reactor comprising a pair of reactor walls extending vertically and facing each other, one of said walls being maintained at a high temperature and the other being maintained at a low temperature, so that the methane gas is dimerized primarily through the dehydrogenation on the surface of the high temperature wall to form C_2 hydrocarbons and hydrogen, and the C_2 hydrocarbons are preferentially diffused and transferred to the low temperature wall side by thermal diffusion effects.

4,929,798
PSEUDOADIABATIC REACTOR FOR EXOTHERMAL CATALYTIC CONVERSIONS

Hugo I. de Lasa, London, Canada, assignor to Canadian Patents and Development Limited, Ontario, Canada

Division of Ser. No. 189,404, Apr. 27, 1988, which is a continuation of Ser. No. 702,576, Feb. 19, 1985, abandoned. This application Dec. 22, 1988, Ser. No. 288,158
Claims priority, application Canada, Mar. 5, 1984, 448807
Int. Cl.[5] C07C 1/20
U.S. Cl. 585—922 1 Claim

1. A pseudoadiabatic process for exothermic catalytic conversion of gasoline constituent forming reactants including C_1 to C_3 alcohols, conducted in a multi-tubular catalytic reactor, wherein the reactor includes a bundle of parallel tubes having inlet and outlet ends and a consistent confined volume of catalyst within each of the tubes along their length, each of said tubes being continuous along its length and independent of all other tubes and having effective reactive regions therein all of essentially the same length as defined by said consistent confined volume of catalyst in each of said tubes, each tube further having an inlet and an outlet side, and means defining a discrete channel along adjacent tubes of the bundle to provide thereby a plurality of channels through the bundle where each tube of the bundle is in contact with a coolant flowing in one or more of said channels, said plurality of channels having an inlet side and an outlet side, wherein said process comprises:

passing said reactants at a known preselected concentration through said bundle of parallel tubes wherein the inlet temperature is high enough to initiate said catalytic conversion throughout said volume of catalyst;

introducing said coolant to said discrete channels at a temperature substantially the same as the inlet temperature of said reactants and passing said coolant through each of said discrete channels in a direction co-current with the direction of flow of said reactants through said bundle of tubes at a preselected flow rate sufficient to substantially match the temperature rise of the catalytic conversion reaction for the partial pressure of reactants selected and the heat transfer characteristics of the catalyst and said tubes so that the coolant is substantially the same temperature as the temperature of the reaction product stream leaving the outlet of the tubes containing the confined volume of catalyst substantially encompassing the reaction time, said outlet temperature not exceeding a preselected maximum temperature suitable for maximum conversion of said reactants into desired reaction product without the need for recycle of the reaction product and unreacted reactants to achieve further conversion;

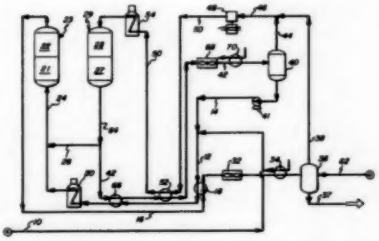
sensing the temperature of reaction products at said outlet side of said tube bundle; and

varying either said partial pressure of reactants or said coolant flow rate to maintain said sensed temperature to said highest temperature level at said outlet side.

4,929,799
ISOMERIZATION PROCESS

Thomas C. Holcombe, South Salem; Thomas C. Sager, Mahopac; Warren K. Volles, Mount Kisco, and Andrew S. Zarchy, Amawalk, all of N.Y., assignors to UOP, Des Plaines, Ill.

Continuation of Ser. No. 62,762, Jun. 15, 1987, abandoned. This application Feb. 16, 1989, Ser. No. 311,399
Int. Cl.[5] C07C 9/14
U.S. Cl. 585—737 29 Claims



1. A process for upgrading the octane of a hydrocarbon feed containing non-normal hydrocarbon compounds and normal pentane and hexane by a combined isomerization-adsorption process in the adsorber-lead configuration, comprising:

(a) passing an adsorber feed stream comprising hydrogen, reactor hydrocarbon product and said hydrocarbon feed in vapor phase to an adsorber bed having adsorbent and bed void space during an adsorption step, to adsorb normal hydrocarbons from said adsorber feed stream and produce an adsorption effluent comprising hydrogen and non-normal hydrocarbons wherein the bed void space contains a mixture of hydrogen and unadsorbed adsorber feed comprising non-normal hydrocarbons upon completion of said adsorption step:

(b) passing a hydrogen-rich purge gas through said adsorber bed containing adsorbed normal hydrocarbons and a bed void space containing said mixture of hydrogen and unadsorbed adsorber feed comprising non-normal hydrocarbons during a desorption step to desorb normal hydrocarbons and produce a desorption effluent comprising purge gas and normal hydrocarbons;

(c) passing said desorption effluent through an isomerization reactor in vapor phase to convert at least a portion of the normal hydrocarbons in said desorption effluent to non-normal hydrocarbons and produce a reactor effluent com-

prising purge gas and reactor hydrocarbon product comprising non-normal and normal hydrocarbons;

(d) recycling a portion of said reactor effluent, without substantial cooling thereof, to provide a portion of said adsorber feed;

(e) separating the remaining portion of said reactor effluent into a hydrogen-rich fraction and a hydrocarbon-rich fraction; and

(f) recycling at least a portion of said hydrogen-rich fraction to provide a portion of said purge gas.

4,929,800

HYDROCARBON CONVERSION AND POLYMERIZATION CATALYST AND METHOD OF MAKING AND USING SAME

Russell S. Drago, and Edward E. Getty, both of Gainesville, Fla., assignors to University of Florida, Gainesville, Fla.

Division of Ser. No. 113,996, Oct. 29, 1987, Pat. No. 4,798,667, which is a division of Ser. No. 921,688, Oct. 22, 1986, Pat. No. 4,719,190. This application Aug. 9, 1988, Ser. No. 230,017

Int. Cl.[5] C07C *5/13*

U.S. Cl. 585—744 **5 Claims**

1. In a hydrocarbon conversion process selected from the group consisting of isomerization and alkylation wherein at least one hydrocarbon is contacted with a conversation catalyst under conversion conditions, the improvement comprising contacting aid hydrocarbon with a catalyst prepared by reacting an adsorbent solid containing surface hydroxyl groups with a Lewis acid selected from the group consisting of aluminum halides, antimony halides and mixtures thereof and a halogenated organic solvent selected from the group consisting of CCl_4, $CHCl_3$ and mixtures thereof at a temperature and for a time sufficient for said Lewis acid to react with at least a portion of said surface hydroxyl groups.

ELECTRICAL

4,929,801

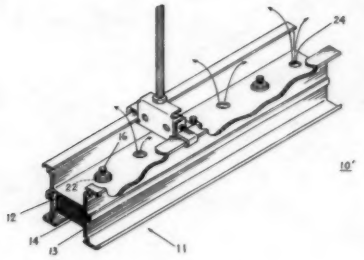
THERMALLY EFFICIENT VENTILATED ELECTRIC BUSWAY SYSTEM

David A. Hibbert, South Windsor, Conn., assignor to General Electric Company, New York, N.Y.

Filed Aug. 30, 1989, Ser. No. 400,904

Int. Cl.[5] H02G *5/06, 5/10*

U.S. Cl. 174—16.2 **3 Claims**



1. Electric power busway comprising:

a pair of opposing side rail supports;

a plurality of planar bus bars intermediate said side rail supports, said bus bars having a first plurality of longitudinally spaced apertures, each aperture of said first plurality of apertures receiving an insulated bolt holding said bus bars fixedly to said support and said bus bars having a second plurality of longitudinally spaced apertures, said apertures of said second plurality of apertures being unobstructed providing airways for passage of cooling air through said bus bars,

wherein said apertures of said first plurality of apertures have a first diameter and said apertures of said second plurality of apertures have a second diameter larger than said first diameter.

4,929,802

ELECTROMAGNETICALLY SHIELDED CABIN

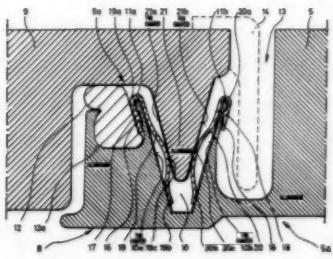
Arno Schaepers, Friedrichshaften, and Bernd Grabherr, Ravensburg, both of Fed. Rep. of Germany, assignors to Zeppelin-Metallwerke GmbH, Fed. Rep. of Germany

Filed Dec. 14, 1988, Ser. No. 284,393

Claims priority, application Fed. Rep. of Germany, Dec. 16, 1987, 8716599[U]

Int. Cl.[5] H05K *9/00*

U.S. Cl. 174—35 MS **9 Claims**



1. An electromagnetically shielded cabin with a sealing system for an abutting area between a stationary component and a movable wall component such as a door, a flap, a hatch or a window, said sealing system comprising two spaced, bent contact springs being connected to the one component between which a contact web connected to the other component can be pressed, contact surfaces being in each case formed between the contact web and the contact springs and the contact springs and the one component, at least one of said contact surfaces is comprised of aluminum and in particular, said contact surfaces comprised of aluminum are provided with a coating of tin.

4,929,803

PLANAR CONDUCTIVE PIECE WITH ELECTRICAL ANISOTROPHY

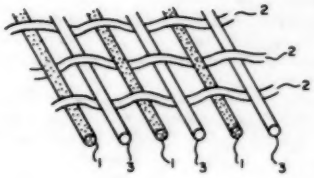
Masaru Yoshida; Mitsuhiko Yoshikawa; Yoshikazu Yoshimoto; Hiroshi Wada; Tomonari Suzuki, and Shigeo Nakajima, all of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 164,252, Mar. 4, 1988, abandoned. This application Jun. 20, 1989, Ser. No. 370,130

Claims priority, application Japan, Mar. 25, 1987, 62-72892

Int. Cl.[5] H01B *7/08*

U.S. Cl. 174—117 M **10 Claims**



1. An electrically anisotropic planar conductive piece capable of simultaneously transmitting mutually independent electrical signals through a plurality of mutually parallel paths in a specified direction, said piece comprising

a first group of conductive lines arranged substantially in said specified direction,

a second group of insulative lines arranged substantially in said specified direction, and

a third group of insulative lines crossing said first and second groups of lines,

said lines all having a diameter no less than 10 micrometers and less than 0.05 millimeter, said first and second groups of lines being arranged together at linear density of more than 10 lines but less than 200 lines per inch, said conductive lines being kept in mutually non-contacting and electrically insulated relationship so as to form mutually insulated current paths.

4,929,804

PUSH BUTTON SWITCH

Nobuyuki Kawai, Gunma, and Mitsuhiro Nakamura, Tokyo, both of Japan, assignors to Toshiba Silicone Co., Ltd., Japan

Filed Dec. 1, 1988, Ser. No. 278,408

Claims priority, application Japan, Dec. 4, 1987, 62-306944

Int. Cl.[5] H01H *21/80, 13/12;* **H01C** *10/10*

U.S. Cl. 200—5 A **1 Claim**

1. A push button switch having a resistance value varying in response to variations in a pressure applied thereto, said push button switch comprising:

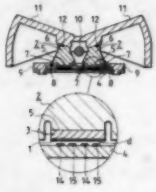
a printed circuit board having electrode patterns;

a pressure-sensitive resistance element to be pressed against said electrode patterns, said pressure-sensitive resistance element comprising a conductive layer coated with a layer of solidified pressure-sensitive conductive paste and molded together by press curing under heat;

an insulated push button comprising a pressing surface at a base portion thereof, two projection portions at an upper portion of said insulated push button, and a flange portion fixed to said printed circuit board, said conductive layer of

said pressure-sensitive resistance element being fixed to said pressing surface and being spaced from said electrode patterns by a predetermined gap, and said two projection portions being separated by a thin portion for allowing vertical movement of said insulated push button;

a button cover having two protrusions adjacent in one-to-one correspondence to said two projection portions, either of said protrusions exclusively pressing against one of



said projection portions when said button cover is pressed by a user;

a shaft between said two projection portions for movably supporting said button cover on said printed circuit board, said button cover being movable in a seesawing motion; and

a supporting member fixed to said printed circuit board such that said flange portion is fixedly sandwiched between said supporting member and said printed circuit board.

4,929,805

GAS DAMPED DECELERATION SWITCH

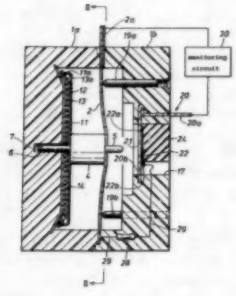
Kazumi Otsubo, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 2, 1988, Ser. No. 239,894

Claims priority, application Japan, Sep. 4, 1987, 62-135273[U]

Int. Cl.[5] H01H *35/14*

U.S. Cl. 200—61.45 R **8 Claims**



1. A deceleration switch for detecting deceleration of a certain magnitude, comprising:

a casing;

a pair of electrodes having internal ends and external ends;

contact means including a retainer member and a spring leaf connector electrically connected to said internal ends of said electrodes;

a mass supported by said retainer member to move from a rest position to an active position for actuating said contact means under its inertial force when deceleration of a certain magnitude is applied to said mass; and

means for checking an electric conductance pathway including at least one of said retainer member and said spring leaf connector of said contact means and at least one of said pair of electrodes.

4,929,806

HEADLIGHT DIMMER SWITCH DEVICE

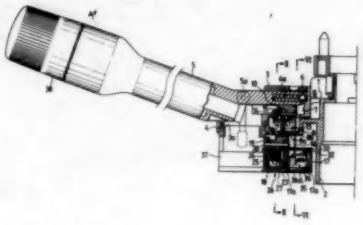
Kenshi Furuhashi, and Hiroyuki Sawada, both of Aichi, Japan, assignors to Kabushiki Kaisha Tokai Rika Denki Seisakusho, Aichi, Japan

Filed Mar. 9, 1989, Ser. No. 321,129

Claims priority, application Japan, Mar. 18, 1988, 63-36664[U]

Int. Cl.[5] H01H *9/00, 13/62, 19/00*

U.S. Cl. 200—61.54 **4 Claims**



1. A switch device comprising:

(a) an actuator member having means for moving linearly in a first direction;

(b) an angularly movable member pivotably movable in second and third directions in response to the movement of said actuator member, the direction of angular movement of said angularly movable member alternating between said second and third directions when said actuator member is moved in said first direction;

(c) a first switch of the momentary type having a first movable contact and a pair of first fixed contacts, means for alternately pivoting said movable contact into contact with said pair of fixed contacts to effect a switching operation in response to said angularly movable member changing from said second to third directions and said third to second directions;

(d) a second switch having a second movable contact and a second fixed contact disposed in opposed relation to said second movable contact; and

(e) a cam member having an operation portion engaged with said second movable contact, means for angularly moving said cam member in response to the movement of said actuator member to cause said operation portion to place said second movable contact in contact with said second fixed contact before said first switch is switched, said operation portion being movable a first distance, said first distance being smaller than the distance traveled by said actuator member.

4,929,807

MINIATURE ILLUMINATED ROCKER SWITCH AND CASE THEREFORE

Richard W. Sorenson, Avon, Conn., assignor to Carlingswitch, Inc., Plainville, Conn.

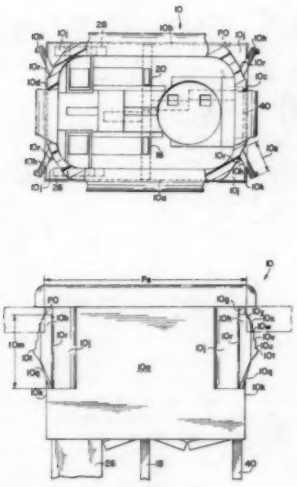
Continuation-in-part of Ser. No. 165,744, Mar. 9, 1988, Pat. No. 4,853,503. This application Feb. 21, 1989, Ser. No. 313,383

Int. Cl.[5] H01H *9/04*

U.S. Cl. 200—296 **17 Claims**

1. A switch case adapted for mounting in a generally rectangular panel opening, said opening having side and end edges, and said panel having a range of thickness, said case comprising an upwardly open generally rectangular housing with first and second opposed pairs of walls associated with said opening side edges and end edges, said walls integrally connected at their adjacent vertical edges to form four corners, said housing having a bottom wall, said pairs of walls having bottom edges integrally joined to said bottom wall, said housing also having an integrally formed outwardly extending peripheral flange,

said first and second pairs of walls having upper edges adjacent said peripheral flange, and four resilient wings integrally connected to the case end walls intermediate the bottom and upper edges thereof, said wings arranged in adjacent pairs and each wing having a root end defining a hinge axis oriented parallel to one of said case corners, each wing having a tip that is adjacent one of said case corners and adapted to be resiliently based to move toward said case end wall during panel mounting, said wings having outer portions that normally extend beyond said case end walls but not beyond the side walls of the switch case so that said outer portions of said wings are adapted to engage the end edges of the rectangular panel opening as a result of which said wings are pivoted about vertical axes spaced inwardly of said switch case corners during the mounting of the switch case in the generally rectangular panel opening.

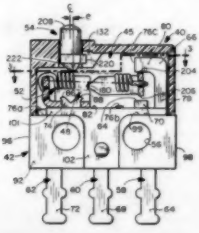


4,929,808

ELECTRICAL SWITCH COMPONENT AND SWITCHES FORMED THEREBY

John O. Roeser, Barrington, and Bruce L. Graham, Schaumburg, both of Ill., assignors to Otto Engineering, Inc., Carpentersville, Ill.

Filed Jun. 13, 1989, Ser. No. 366,146
Int. Cl.[5] H01H *5/08*
U.S. Cl. 200—467 **34 Claims**



19. A snap switch mechanism comprising:

(a) a movable contact means,

(b) switch envelope means formed of insulating material having a first portion and a second portion, said first portion and second portion being cooperable to form an enclosure for said movable contact means;

(c) first, second and third fixed contact means fixedly disposed to said first portion and each respectively having interior and exterior sections, said interior section of said first fixed contact means being an upper contact, means said interior section of said second fixed contact means being a lower contact means, and said interior section of said third contact means being a common contact means, said upper and lower contact means being spaced apart a first distance;

(d) movable contact means mounted on said third contact means for movement between said upper and lower contact means;

(e) coil spring means having a coil diameter and having a first and second ends, said first end being engagable with said movable contact means and said second end being engagable with said third contact means, said coil spring means extending between said movable contact means and said third contact means to bias said movable contact means into engagement with said first fixed contact means;

(f) actuator means movably extending through said second portion for engagement with said coil spring means to cause movement of said movable contact means;

(g) said movable contact means being characterized as being formed solely from sheet metal stock of predetermined thickness and characterized as a stamping having a generally U-shaped con figuration when viewed in a plane substantially transverse to said predetermined thickness, first and second spaced connected by a bail portion, said first and second leg portions being pivotally connected to said third fixed contact means, said bail portion having upper and lower edge portions spaced apart a distance defining a material height, said upper and lower edge portion respectively providing spaced apart upper and lower contact surfaces for engagement respectively with said first and second fixed contact means, said material height substantially greater than and transverse to said predetermined thickness and less than said first distance.

4,929,809

WIRE DRIVE APPARATUS IN A WIRE-CUT ELECTRIC DISCHARGE MACHINE

Toshiyuki Aso, Room 7-208, Fanuc Manshonharimomi, 3539-1, Shibokusa, and Yasuo Arakawa, Fanuc Dai3virakaramatsu, 3527-1, Shibokusa, both of Oshino-mura, Minamitsuru-gun, Yamanashi, 401-05, Japan

PCT No. PCT/JP88/01052, § 371 Date Apr. 13, 1989, § 102(e) Date Apr. 13, 1989, PCT Pub. No. WO89/03271, PCT Pub. Date Apr. 20, 1989
PCT Filed Oct. 15, 1988, Ser. No. 340,293
Claims priority, application Japan, Oct. 15, 1987, 62-258271
Int. Cl.[5] B23H *7/02*; B65G *15/14*; B65H *51/00*
U.S. Cl. 219—69.12 **11 Claims**

1. A wire drive apparatus in a wire-cut electric discharge machine, comprising:

a pair of belt sections for feeding a wire and each having a belt, said pair of belt sections being arranged to be movable relative to each other between a wire extension operating position where said belts are in contact with each other and a retracted position where said belts are out of contact with said wire;

means for causing the relative movement of said pair of belt section between said wire extension operating position and said retracted position;

a pair of rollers disposed downstream from said pair of belt sections for feeding said wire held therebetween;

means for rotatively driving at least one of said pair of rollers; and

means for establishing the operative coupling of said at least one rotatively driven roller with at least one of said pair of belt sections during wire extension so that at least one of said belts is driven in synchronism with rotation of said at least one rotatively driven roller, and for releasing the operative coupling after completion of the wire extension.

4,929,810

WIRE CUT ELECTRIC DISCHARGE MACHINE

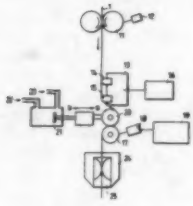
Hiroyasu Kawase, Aichi, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 14, 1989, Ser. No. 365,886

Claims priority, application Japan, Jul. 6, 1988, 63-166947

Int. Cl.[5] B23H *7/10*; B21F *11/00*

U.S. Cl. 219—69.12 **7 Claims**



1. A wire cut electric discharge machine comprising:

a wire electrode confronted with a workpiece with a small gap therebetween;

wire electrode feeding rollers driven by a driving motor;

first means for applying a force of tension to said wire electrode to cut said wire electrode, which including controlling circuit having first selecting means for automatically selecting a force of tension which is best for said wire electrode to be cut according to the diameter and kind of said wire electrode;

second means for applying a current to said wire electrode to fuse said wire electrode, which including a cutting portion and a cutting circuit, said cutting circuit having second selecting means for automatically selecting a current which is best for a wire electrode to be cut according to the diameter and the kind of said wire electrode; and

a wire electrode retaining roller coupled to an air cylinder which is moved by receiving air pressure from an air pressure source.

4,929,811

PLASMA ARC TORCH INTERLOCK WITH DISABLING CONTROL ARRANGEMENT SYSTEM

George D. Blankenship, Chardon, Ohio, assignor to The Lincoln Electric Company, Cleveland, Ohio

Filed Dec. 5, 1988, Ser. No. 280,240

Int. Cl.[5] B23K *9/00*

U.S. Cl. 219—121.54 **48 Claims**

1. A plasma arc torch system for effecting various metal processes on a workpiece comprising:

an electrical power source;

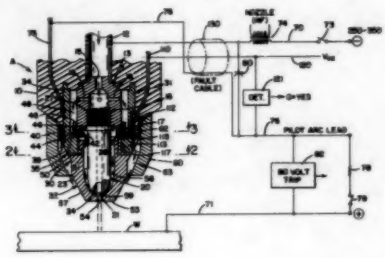
a gas supply source for generating a plasma;

a torch body including an electrode and an insulated, electrically conductive nozzle assembly circumscribing said electrode at a fixed distance therefrom;

fault detect circuit means including a pilot arc lead connected to the nozzle assembly at one end and at its other end to ground for sensing a short circuit between said nozzle assembly and said electrode and disabling said power source in response thereto;

a cable connected to said torch body, a main electrical conductor within said cable connected at one end to said electrode and at its other end to said power source; and

sensing means within said cable detecting a puncture of the cable sufficient to contact said main conductor and in



response to said contact actuating said fault detect circuit means to disable said power source; said sensing means including a continuous, electrically conductive shield circumscribing the main conductor and a drain lead in electrical contact with said shield and said pilot arc lead so that a short between the drain lead and main conductor will be sensed and conveyed to pilot arc lead to actuate said fault detect circuit means.

4,929,812

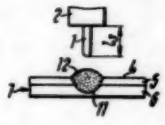
METHOD FOR ELECTRICAL ARC SPOT WELDING WITH CONSUMABLE ELECTRODE

Alfred V. Ivannikov, and Vladimir Z. Abudardin, both of Leningrad, U.S.S.R., assignors to Tsentr Nauchno-Tekhnicheskogo Tvorchestva Molodezhi "ASTRON" , Leningrad, U.S.S.R.

Continuation of Ser. No. 134,783, Sep. 23, 1987, abandoned. This application Sep. 20, 1989, Ser. No. 410,014

Int. Cl.[5] B23K *9/28*

U.S. Cl. 219—137.2 **2 Claims**

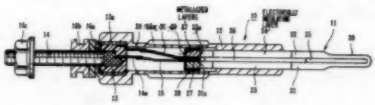


1. A method of electrical arc spot welding with a consumable electrode, comprising securing a consumable electrode (1) in a current carrying device (2), positioning the consumable electrode (1) over a surface (4) of a part (5) to be fused, firing a welding arc (8) between an end face (3) of the consumable electrode (1) and the surface (4) of the part (5) being fused, moving the current carrying device (2) with the consumable electrode secured therein towards the surface (4) of the part (5), and carrying out the welding with the formation of a weld spot (11), wherein the feeding of the consumable electrode (1) to the fusion space (9) is produced by an accelerated movement of the current carrying device (2) in a direction to the surface (4) of the part (5) at a speed exceeding the rate of fusion of the electrode.

4,929,813
GLOW PLUG FOR DIESEL ENGINE

Mitusuke Masaka; Koji Hatanaka; Kenji Maruta, and Seiji Okazaki, all of Saitama, Japan, assignors to Jidosha Kiki Co., Ltd. and Hitachi Metals, Ltd., both of Tokyo, Japan

Filed May 27, 1988, Ser. No. 199,383
Claims priority, application Japan, May 28, 1987, 62-132085
Int. Cl.[5] F23Q *7/22;* **F02P** *19/02;* **H05B** *3/00*
U.S. Cl. 219—270 **8 Claims**

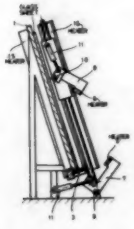


1. A glow plug for a diesel engine, comprising:
an elongated hollow electrically conductive holder;
a rod-like ceramic heater held at a distal end of said hollow holder such that one end of said rod-like ceramic heater extends outside;
an external connecting terminal positioned in the other end of said hollow holder;
an insulating member for electrically insulating said external connecting terminal from said hollow holder; and
a metal pipe positioned between an inner surface of the other end of said hollow holder and said insulating member;
said ceramic heater comprising a U-shaped heating element and a pair of parallel lead portions extending backward from both ends of said U-shaped heating element, said U-shaped heating element and said pair of parallel lead portions being made of a resistive ceramic material and being arranged such that outer surfaces of said lead portions are held by the distal end of said holder through electrical insulating layers between the inner surface of said holder and the outer surface of said lead portions, rear end portions of said lead portions constituting electrode extraction ends and being separated from said holder in said holder, the electrode extraction end of one lead portion being electrically connected to said external connecting terminal through a conductive material, and said electrode extraction end of the other lead portion being electrically connected to said metal pipe, said metal pipe being electrically connected to said holder.

4,929,814
APPARATUS FOR HEATING THE MARGINAL ZONE OF GLASS SHEETS

Peter Lisec, Bahnhofstrasse 34, Amstetten-Hausmening, Austria (A-3363)

Filed Oct. 4, 1988, Ser. No. 252,931
Claims priority, application Austria, Oct. 5, 1987, A252887
Int. Cl.[5] H05B *3/06*
U.S. Cl. 219—388 **5 Claims**

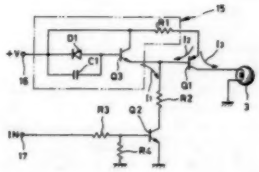


1. Apparatus for heating the marginal zone of glass sheets to which prefabricated spacer strips are to be applied, comprising a lateral support (1) for glass sheets, with a linear conveyor (2) provided at a lower rim of the support (1), said conveyor including a series of conveying rollers (3), with two horizontally aligned, elongated heating elements (5, 6) associated with horizontal marginal zones of the glass sheets, one (5) of the horizontally aligned heating elements (5, 6) being arranged immediately above the linear conveyor (2) and the other one (6) of the horizontally aligned heating elements (5, 6) being movable upwards and downwards (arrow 18) along the lateral support (1), and with an elongated heating device (14) oriented substantially vertically, characterized in that the horizontally aligned heating elements (5, 6) are attached to supports (7, 8) pivotable about horizontal axes (9, 10), so that the heating elements (5, 6) can be swung away from their operative position associated with the glass sheet, and that the elongated heating device (14) is provided beside a vertical rim (13) of the lateral support (1) on a discharge side and includes two mutually facing heating elements (15, 16).

4,929,815
HEATING RESISTOR DRIVING CIRCUIT WHICH SUPPRESSES CURRENT SPIKES

Satoru Takemoto, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 20, 1989, Ser. No. 340,733
Claims priority, application Japan, Apr. 20, 1988, 63-97469
Int. Cl.[5] H05B *1/02*
U.S. Cl. 219—501 **3 Claims**



1. A drive circuit for a heating resistor element, comprising:
a first transistor having first, second, and third terminals, said first terminal being connected in series to said heating resistor element relative to a power source terminal:
a second transistor having first, second, and third terminals, said first terminal of said second transistor being connected in series to said second terminal of said first transistor, said second transistor being turned on in response to an actuating signal; and
suppression means, responsive to a conductive state of said second transistor, for raising gradually a base current of said first transistor to a predetermined level, so as to suppress a current spike through the heating resistor element at a beginning of driving said heating resistor element.

4,929,816
ELECTRIC FLASH-BUTT WELDING MACHINE AND METHOD OF PROVIDING A WELDED JOINT BETWEEN ADJACENT ENDS OF RAIL SECTIONS

Josef Theurer, Vienna; Friedrich Oellerer, Linz, and Leopold R. Gruber, Scheibbs, all of Austria, assignors to Franz Plasser Bahnbaumaschinen-Industriegesellschaft GmbH, Vienna, Austria

Filed Jan. 24, 1989, Ser. No. 301,330
Claims priority, application European Pat. Off., Feb. 1, 1988, 88890021.4; Feb. 1, 1988, 88890022.2
Int. Cl.[5] B23K *11/04*
U.S. Cl. 219—53 **23 Claims**

1. A mobile electric flash-butt welding machine for welding together adjacent ends of successive rail sections of a rail of a

track consisting of two rails fastened to successive ties, which comprises

(a) a machine frame,

(b) undercarriages supporting the machine frame on the track for mobility therealong in an operating direction,

(c) a drive for propelling the machine frame along the track, and the machine frame carrying

(d) a hydraulic fluid supply pump means,

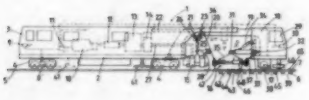
(e) an electric current generator,

(f) motor means for operating the pump means and the generator,

(g) a longitudinally, transversely and vertically adjustable electric flash-butt welding head for selectively welding together the adjacent rail section ends of a respective one of the track rails, the welding head comprising

(1) two welding head halves movable towards and away from each other in a direction of the rail,

(2) hydraulic cylinders for moving the two welding head halves in said direction,



(3) a pair of clamping and welding jaws on each welding head half, and

(4) a hydraulic clamping cylinder connecting the jaws of each pair,

(h) a welding control connecting the pump means and generator to the hydraulic cylinders and jaws respectively for hydraulically and electrically operating the clamping and welding jaws, and

(i) an apparatus for tensioning or longitudinally sliding the rail, the apparatus being associated with the welding head for encompassing the welding head in a horizontal plane passing through the rail and comprising

(1) two pairs of rail clamping jaw means for engaging the rail section ends immediately ahead of, and behind, the welding head, and

(2) a hydraulic cylinder-piston arrangement extending in the direction of the rail and comprising respective operating cylinders connecting the pairs of rail clamping jaw means for operation thereof.

4,929,817

ELECTROFUSION JOINT

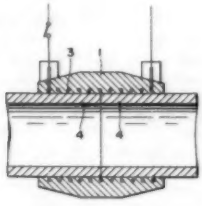
Kazunori Mito, Iwakuni, and Masahiro Hirata, Hiroshima, both of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Jul. 27, 1988, Ser. No. 224,658

Claims priority, application Japan, Jul. 29, 1987, 62-117411[U]

Int. Cl.[5] H05B *3/58*

U.S. Cl. 219—544 **17 Claims**



1. In an electrofusion joint for connecting plastic pipes with each other comprising a molded body, receivable of said pipes, and a metallic heating coil, embedded in said molded body, for application of heat to said molded body and said pipes to thermally fuse said joint and said pipes to one another, the improvement comprising:

(A) providing said metallic heating coil with a substantially non-oxidized surface; and

(B) (1) forming said molded body from an adhesive resin or (2) coating the surface of said metallic heating coil with a substance which has an affinity to both of said molded body and said metallic heating coil.

4,929,818

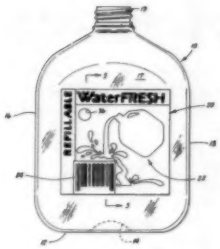
METHOD AND APPARATUS FOR VENDING A CONTAINERIZED PRODUCT ON MULTIPLE OCCASIONS FOLLOWING AT LEAST ONE REFILL OF THE CONTAINER WITH THE PRODUCT

Harold M. Bradbury; Dwight B. Pfenning, both of Norman; William R. Corlett, Afton, and Roscoe Mays, Jr., Edmond, all of Okla., assignors to Rainbarrel Corporation, Afton, Okla.

Filed Nov. 15, 1988, Ser. No. 271,900

Int. Cl.[5] G06F *15/24*

U.S. Cl. 235—381 **16 Claims**



1. The method of vending a containerized product by selling multiple fillings of the same product in the same container, the container having machine-readable indicia thereon indicative of at least the price of the product, the method comprising:

placing adjacent the indicia at the time of, or subsequently to, placement of said indicia, a stimulus-responsive machine-readable indicator capable of responding to a stimulus to undergo a change of state readable by the machine capable of reading the indicia, and readable conjunctively with said indicia to indicate a price to be charged for the product alone in the refilled container;

then, after initial vending of the container and product, refilling the container with the product at least once while concurrently, during at least the initial refill, stimulating said indicator to cause it to respond to the stimulus by undergoing said change of state, whereby the customer buying a refill of product is charged, on the basis of the subsequent machine reading, only for the product, and not for the container which is refilled.

4,929,819

METHOD AND APPARATUS FOR CUSTOMER PERFORMED ARTICLE SCANNING IN SELF-SERVICE SHOPPING

Donald A. Collins, Jr., Cambridge, Ohio, assignor to NCR Corporation, Dayton, Ohio

Filed Dec. 12, 1988, Ser. No. 283,116

Int. Cl.[5] G06F *15/84; G06K 19/06*

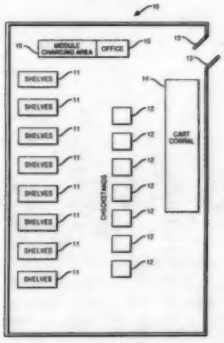
U.S. Cl. 235—383 **27 Claims**

1. A system for self-service selection and purchasing of articles bearing coded indicia in a retail establishment, comprising:

a plurality of customer-operated carts moveable about the

retail establishment, each cart including a multi-walled receptacle for receiving and transporting articles having product codes thereon, which articles may be selected for purchase;

a plurality of detachable modules, one for each cart, which are secured to said carts adjacent one end of said receptacle; each said module including a scanner for scanning said product code on said articles, each said module also including video camera means capable of covering a first area to record images of articles being scanned by the scanner and capable of covering a second area to record images of articles being placed in the receptacle; each said module also including data processing means for associating the information scanned by the scanner with the images recorded by the video camera means and for storing



such associated information; each said module also including display means for displaying the data scanned by the scanner; and each said module also including a power supply; and

checkout means to which the carts are directed when the purchasing of articles to be placed in their receptacles has been completed; said checkout means including means for receiving the module for each cart; said checkout means also including means for totaling and printing out the information scanned by the scanner and stored by the data processing means of said module; and said checkout means also including means for displaying the video information recorded by the module to enable an operator at the checkout means to verify the correctness of the actions of the customer in scanning and transporting articles to be purchased.

4,929,820

PROCEDURE AND LABEL FOR BAR CODE MARKING ON VULCANIZABLE OR VULCANIZED RUBBER PRODUCTS

Frank Jespersen, Lystrup, Denmark, assignor to Milliken Denmark A/S, Morke, Denmark

Filed Oct. 13, 1988, Ser. No. 257,460

Claims priority, application Denmark, Aug. 1, 1988, 4280/88

Int. Cl.[5] G06K *19/00*

U.S. Cl. 235—487 **6 Claims**

1. Method of bar coding a vulcanizable or vulcanized rubber product with a plurality of different bar code markings comprising the steps of: providing a source of electromagnetic radiation, applying varying wave lengths and levels of radiation from the electromagnetic radiation source onto the surface of the rubber product to form a bar code pattern thereon and controlling the radiation from the electromagnetic radiation source by an electronic control system to cause the electromagnetic source to provide radiation in the wave lengths and

levels of energy to form the predetermined bar code pattern on the rubber product.

4,929,821

METHOD OF FORGERY-PROTECTING A DATA CARRIER, A FORGERY-PROTECTED DATA CARRIER AND APPARATUSES FOR HANDLING, PROCESSING AND MONITORING THE DATA CARRIER

Wolfram Kocznar, Innsbruck, and Kurt Wallerstorfer, Strasswalchen, both of Austria, assignors to Skidata Computer G.m.b.H., Gartenau-St. Leonhard, Austria

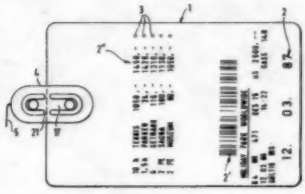
PCT No. PCT/AT87/00017, § 371 Date Nov. 12, 1987, § 102(e) Date Nov. 12, 1987, PCT Pub. No. WO87/05728, PCT Pub. Date Sep. 24, 1987

PCT Filed Mar. 12, 1987, Ser. No. 127,895

Claims priority, application Austria, Mar. 12, 1986, 644/86; Mar. 12, 1986, 645/86; Mar. 12, 1986, 646/86; Mar. 12, 1986, 647/86; Mar. 12, 1986, 648/86

Int. Cl.[5] G06K *19/06*

U.S. Cl. 235—493 **34 Claims**



1. Forgery-protected data carrier with physical authenticating features in the form of characteristic inhomogeneities of a magnetic layer of the data carrier, the magnetic layer comprising at least two superimposed films having substantially identical magnetic properties, whereby at least one of said films has localized discontinuities producing said characteristic inhomogeneities.

4,929,822

DETECTION SYSTEM WITH AN OPTICAL ENCODER TO OPTICALLY DETECT DISPLACEMENT AMOUNT OF A MOVABLE DEVICE

Nobuaki Nakamura; Yukimi Hirose, both of Fujieda; Masakatsu Kai, and Makoto Itonaga, both of Yokahama, all of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan

Filed Feb. 22, 1989, Ser. No. 313,672

Claims priority, application Japan, Feb. 22, 1988, 63-37630; Feb. 22, 1988, 63-37631; Feb. 22, 1988, 63-37632; Mar. 17, 1988, 63-64369

Int. Cl.[5] G01J *1/20*

U.S. Cl. 250—201.4 **19 Claims**

1. An optical detection system for detecting a displacement amount of a movable device, comprising:

optical encoder means adapted to be movable in accordance

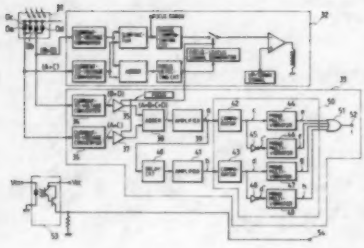
with a movement of said movable device, said optical encoder being composed of at least a light-reflecting layer and having on said light-reflecting layer a plurality of pits formed in geometric convex or concave configuration and successively strung in a predetermined direction;

optical pickup means disposed in opposed relation to said optical encoder means for optical picking up the pit information by irradiating said optical encoder with a light beam and by receiving a reflection light beam from said optical encoder means, said optical pickup means including:

(a) a light-emitting device for emitting the light beam to said optical encoder means;

(b) an optical device for introducing the light beam from said light-emitting device into the pit string to apply a light spot to the pit string; and

(c) a photodetector having a plurality of photosensitive elements for receiving a light beam due to reflection of the light spot applied to the pit string, each of said photosensitive elements generating an electrical signal corresponding to the incident light beam thereon;



focus control circuit means responsive to the electrical signals from said plurality of photosensitive elements of said photo detector and coupled to said optical device for controlling said optical device on the basis of the electrical signals therefrom so that the light beam from said light-emitting device is focused on the pit string of said optical encoder; and detection circuit means responsive to the electrical signals from said plurality of photosensitive elements thereof for detecting information of the movement of said movable device and producing a pit detection signal indicative of the information of the movement thereof, said detection circuit means including:

(a) an adder for obtaining a sum signal of the electrical signals from said photosensitive elements;

(b) a delay circuit connected to said adder to delay said sum signal by a predetermined amount so as to give a predetermined phase difference between said sum signal and the delayed sum signal; and (c) a pit-information generating circuit connected to said adder and said delay circuit so as to produce said pit detection signal on the basis of said sum signal from said adder and the delayed sum signal from said delay circuit.

4,929,823

OPTICAL PICKUP HEAD WITH HOLOGRAPHIC SERVO SIGNAL DETECTION USING A SPOT SIZE DETECTION SYSTEM

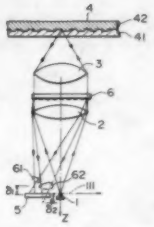
Makoto Kato, Nishinomiya; Tetsuo Saimi, Hirakata, and Shunji Ohara, Higashiosaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Oct. 4, 1988, Ser. No. 253,076

Claims priority, application Japan, Oct. 5, 1987, 62-251025; Oct. 5, 1987, 62-251026

Int. Cl.[5] G01J *1/20*

U.S. Cl. 250—201.5 **16 Claims**



1. An optical pickup head apparatus comprising:

a light source for emitting a coherent beam or a quasi-monochromatic beam;

an imaging optics for focusing the coherent beam or quasi-monochromatic beam into a small spot;

a diffraction element, disposed in an optical path on which the coherent beam or semi-monochromatic beam passing through said optics is reflected from a given optical storage medium or diffracted thereby, for producing two wave fronts of the same diffractio order and of different focal points in off-axis directions tive to the optical axis of said optics; and

first and second photodetectors each having a plurality of photodetecting element boundaries extending in an optional direction between one direction coincident with and another direction substantially parallel to a radial line with a center located at a focal point of a 0-order diffraction beam produced from said diffraction element, for receiving said two wave fronts on their coplanar detection surfaces near the different focal points.

4,929,824

LIGHT METERING DEVICE WITH DETECTOR MATRIX AND MEAN VALUE DETECTION

Takao Miyazaki, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 24, 1989, Ser. No. 315,113

Claims priority, application Japan, Feb. 26, 1988, 63-43453; Feb. 26, 1988, 63-43454; Mar. 11, 1988, 63-57965

Int. Cl.[5] H01J *40/14*

U.S. Cl. 364—525 **9 Claims**

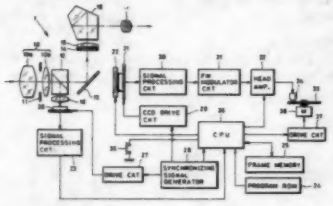
1. A light metering device comprising:

light detecting means consisting of a plurality of light detecting elements arranged in a matrix for defining a plurality of light metering areas different in area in an image field in such a manner as to contain a smaller light metering area within a larger light metering area;

calculating means for obtaining a mean brightness value of each light metering area by calculating an arithmetic mean value of outputs from light detecting elements corresponding to each of said plurality of light metering areas; and

determining means for comparing the difference of mean

brightness value between two of each said plurality of light metering areas with a predetermined certain value



given for each said two light metering areas to determine lighting conditions under which a subject exists.

4,929,825

MEANS FOR DETECTING DAMAGE TO THE CARD CONNECTING THE PHOTOSENSOR AND MAIN BODY PULSIMETER

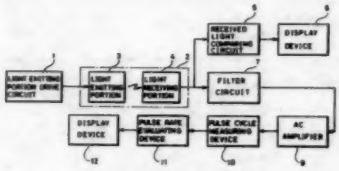
Hachiro Maeyama, Nara, Japan, assignor to Tsuyama Mfg. Co., Ltd., Osaka, Japan

Filed Aug. 8, 1988, Ser. No. 230,294

Claims priority, application Japan, Aug. 7, 1987, 62-121946[U]

Int. Cl.[5] G01V 9/04

U.S. Cl. 250—221 **7 Claims**



1. A pulsimeter comprising:

a pulse sensor portion including a photosensor formed by a light emitting portion and a light receiving portion, said photosensor adapted for contact with a human body,

a main body for measuring pulse of the human body based on a quantity of light received by said light receiving portion,

means connecting the photosensor and the main body, and

indication means for indicating when said quantity of light exceeds a predetermined value, to give an indication of damage to the means connecting the photosensor and the main body.

4,929,826

MOUTH-OPERATED CONTROL DEVICE

Joseph Truchsess, 11 Windward La., City Island, N.Y. 10464, and Michael Matthews, 245 E. 63rd St., New York, N.Y. 10021

Filed Sep. 26, 1988, Ser. No. 249,709

Int. Cl.[5] G01V 9/04

U.S. Cl. 250—221 **13 Claims**

10. A method for performing machine control function by use of the machine operator's mouth movements, comprising positioning an electronic light-sensitive element relative to the operator for receiving a portion of the ambient light energy present within the mouth of the operator, and using the output of said element to control said machine function.

4,929,827

INTELLIGENT PALLET

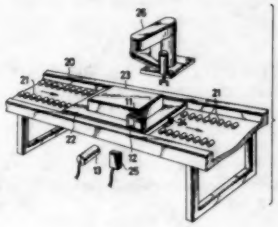
Takahide Nakayama, Kumamoto, Japan, assignor to Hirata Industrial Machineries Co., Ltd., Tokyo, Japan

Filed Dec. 13, 1988, Ser. No. 283,801

Claims priority, application Japan, Dec. 14, 1987, 62-189797[U]

Int. Cl.[5] G01N 9/04

U.S. Cl. 250—223 R **3 Claims**



1. An intelligent pallet comprising a memory unit, a light emitter means and a data processing unit disposed in remote, cooperative relation with said light emitter means, said memory unit comprising a photoelectric voltage converter and an electric cell, said voltage converter powering only data for processing, said voltage converter being activatable to receive and convert a light energy emitted from said emitter means into an electric energy and to send said electric energy to said processing unit thereby effecting a series of operation including receiving, transmitting, recording, reading out a stream of data, external to said memory unit, said cell being operable to generate an electric energy solely for storage of the data.

4,929,828

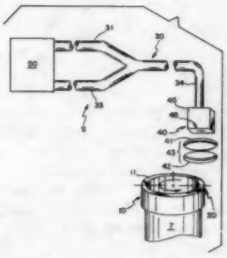
INSPECTING GLASS CONTAINERS FOR LINE-OVER FINISH DEFECTS WITH BIFURCATED FIBER OPTIC BUNDLE

Mark P. Claypool, Horseheads, N.Y., assignor to Emhart Industries, Inc., Hartford, Conn.

Filed Feb. 29, 1988, Ser. No. 161,623

Int. Cl.[5] G01N 9/04; B07C 5/00

U.S. Cl. 280—223 B **19 Claims**



1. Apparatus for optically inspecting the sealing surface of glass containers, comprising:

a scanning head, comprising a bifurcated fiber optic bundle including sender and receiver bifurcations respectively containing sender and receiver optical fibers, and a joined portion containing said sender and receiver fibers, said joined portion terminating at a probe end;

a light source for illuminating the sender fibers;

a lens system for imaging the light emitted from the probe end onto said sealing surface, and for transmitting light reflected by said sealing surface toward said probe end; and

processing means for producing output signals essentially representative of the intensity of light transmitted by the receiver fibers;

said sealing surface substantially defining a plane, and the probe end located substantially along a perpendicular to the sealing surface plane at the location where said light from the probe end is imaged on said surface.

4,929,829

METHOD FOR DETECTING FLOODING OF A SURFACE

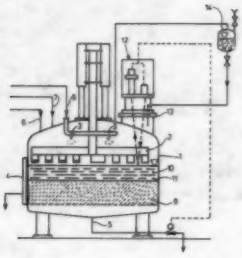
Hubert Dedden, Waldbroel-Hermesdorf; Eckhard Gieger, Leverkusen, and Christian Lauer, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Aug. 4, 1989, Ser. No. 389,443

Claims priority, application Fed. Rep. of Germany, Aug. 25, 1988, 3828821

Int. Cl.[5] G01N *15/06*

U.S. Cl. 250—208.4 **8 Claims**



1. A method for detecting the point of immersion or emergence of a solid or porous body into or out of a liquid, comprising

(a) generating surface waves in the liquid,

illuminating the surface of the liquid and scanning the reflected light photoelectrically,

(c) detecting only an alternating light component of the reflected light and

(d) comparing the alternating light signal component with a preset threshold value and generating a control signal when the actual value falls below or exceeds the threshold value.

4,929,830

FIBER-OPTIC ELECTRIC FIELD SENSOR WITH PIEZOELECTRIC BODY SENSOR

Klaus Bohnert, Niederrohrdorf; Meinolph Kaufmann, Baden, and Jürgen Nehring, Wettingen, all of Switzerland, assignors to Asea Brown Boveri AG, Baden, Switzerland

Filed Nov. 4, 1988, Ser. No. 267,299

Claims priority, application Switzerland, Nov. 5, 1987, 4322/87; May 2, 1988, 1628/88

Int. Cl.[5] H01J *5/16*

U.S. Cl. 250—227.14 **10 Claims**

1. Fiber-optic sensor for measuring a predetermined directional component of an electric field, comprising

(a) a piezoelectric body (**4**) and

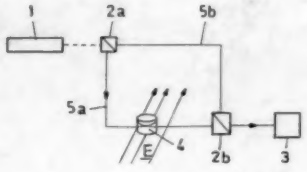
(b) a glass fiber (**5***a*) which is rigidly connected to the piezoelectric body (**4**) in a given length section, and

(c) means for detecting a change in the length of the glass fiber (**5***a*),

wherein

(d) the piezoelectric body (**4**) has the shape of a disk,

(e) the glass fiber (**5***a*) is attached to a disk edge (**6**) in the given length section,



(f) the piezoelectric body (**4**) belongs to one of crystal classes C2v, C4v, C4, C3, C3v, C6, C6v, C∞, C∞v, C2, D3, D3h,

(g) a disk normal is parallel to the predetermined directional component, and

(h) the crystallographic orientation, given by a crystallographic axis of rotation which is parallel to the disk normal is selected as follows:

TABLE IV

Crystal class (Schoenflies [international])		Axis of rotation parallel to the disk normal
C2	[2]	2-fold axis
C2v	[2 mm]	2-fold axis
C3	[3]	3-fold axis
C3v	[3 m]	3-fold axis
D3	[32]	2-fold axis
D3h	[62 m]	2-fold axis
C4	[4]	4-fold axis
C6	[6]	6-fold axis
C∞	[∞]	∞-fold axis
C4v	[4 mm]	4-fold axis
C6v	[6 mm]	6-fold axis
C∞v	[∞ mm]	∞-fold axis.

4,929,831

ELECTRON BEAM APPARATUS FOR TESTING INFRARED DETECTORS IN A CRYOGENICALLY SHIELDED ENVIRONMENT

Larry D. Flesner, San Diego; Welsey L. Eisenman; James D. Merriam, both of Del Mar; Richard L. Bates; Rolf N. Dahle, both of San Diego, all of Calif., and Douglas C. Arrington, Albuquerque, N. Mex., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 8, 1988, Ser. No. 282,717

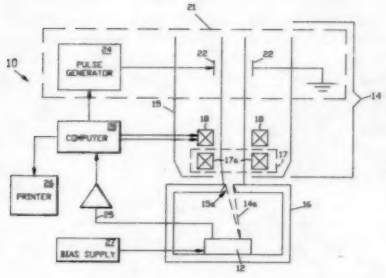
Int. Cl.[5] H01J *37/252*

U.S. Cl. 250—307 **10 Claims**

1. An apparatus for testing an infrared detector in a shielded environment, comprising:

first means for shielding said detector from infrared radiation having a wavelength of at least 1 micrometer;

second means for propagating a selectively focusable and directable electron beam upon said detector; and



third means operably coupled to said detector for detecting a response of said detector to exposure to said beam.

4,929,832

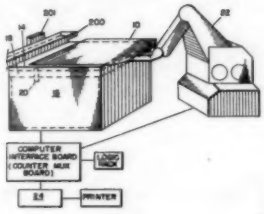
METHODS AND APPARATUS FOR DETERMINING DISTRIBUTIONS OF RADIOACTIVE MATERIALS

Robert S. Ledley, 1002 LaGrande Rd., Silver Spring, Md. 20903

Continuation of Ser. No. 170,042, Mar. 11, 1988, abandoned, which is a continuation of Ser. No. 797,725, Nov. 13, 1985, abandoned. This application Dec. 27, 1988, Ser. No. 291,393

Int. Cl.[5] G01T *1/00*

U.S. Cl. 250—328 **9 Claims**



5. Apparatus for determining the distribution of a radioactive material in a medium which is in the form of a narrow elongated track, said radioactive material comprising a radioactive isotope which emits radiation, said apparatus comprising:

(a) first means for supporting a plurality of identical radiation detectors at a set of predetermined locations spaced along the length of the track, said radiation detectors being arranged in a straight line, said predetermined locations being equally spaced from one another, center to center, by a distance D, and each of said detectors producing an electrical output indicative of the amount of radioactive material in each said band in the vicinity of the detector;

(b) second means for receiving the medium containing the radioactive material;

(c) third means for moving the first and second means relative to one another in a step-like manner only along a path parallel to the straight line and parallel to the long axis of the track so as to position the medium and radioactive bands relative to the detectors at a plurality of predetermined positions which are equally spaced from one another by a distance d, the spacing D between the predetermined locations being several times greater than the spacing d between the predetermined positions, the total relative movement of the first and second means being equal to the spacing D between the predetermined locations; and

(d) fourth means for simultaneously recording the electrical output of each of the detectors after each step at each of the predetermined positions.

4,929,833

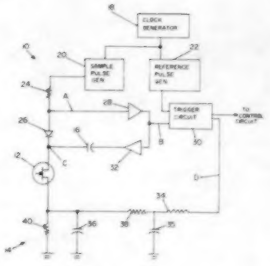
FEEDBACK STABILIZED DIGITAL INFRARED DETECTOR CIRCUIT

Edgar M. Smith, Millersville, Pa., assignor to Burle Technologies, Inc., Wilmington, Del.

Filed Mar. 17, 1989, Ser. No. 324,680

Int. Cl.[5] G01J *5/22*

U.S. Cl. 250—338.1 **6 Claims**



1. A digital control circuit operated by changes of radiation received by an infrared detector comprising:

an infrared detector with first and second terminals which varies the current flowing through it based upon variations of radiation within its field of view with its first terminal interconnected with a circuit return;

a first capacitor with first and second terminals the first terminal being connected to the second terminal of the infrared detector;

a diode with a positive and a negative terminal and its negative terminal connected to the junction of the first capacitor and the infrared detector;

a digital clock generator generating a clock pulse;

a sample pulse generator connected to the output of the clock generator and generating a sample pulse synchronized to the clock pulse, the sample pulse being of sufficient voltage, current and pulse length to charge the first capacitor to a measurable voltage during the sample pulse length, and the sample generator pulse output being connected to the positive terminal of the diode;

a first logic circuit, with an input and an output, which generates an output pulse on its output when the voltage on its input is raised to a specific level, the input of the first logic circuit being connected to the positive terminal of the diode and the output being interconnected with the second capacitor terminal;

a reference pulse generator connected to the output of the clock generator and synchronized with the sample pulse generator, the reference pulse generator producing a reference pulse which begins during the sample pulse; and

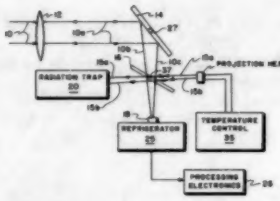
a trigger circuit, one input connected to the output of the reference pulse generator and another input to the output of the first logic circuit, the trigger circuit generating a signal on a first output to activate an external control circuit when the reference pulse and the output of the first logic circuit deviate in time by more than a preselected amount.

4,929,834

THERMAL MASK FOR CRYOGENIC DETECTORS IN A THERMAL IMAGING DEVICE

Wilbur Liebson, Springfield, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sep. 20, 1976, Ser. No. 726,369
Int. Cl.[5] G01J *1/00*; G02B *27/00*
U.S. Cl. 250—352 **10 Claims**



1. A thermal mask for masking radiation from cryogenic detectors comprising in a thermal imaging device:

an array of cryogenic detectors;

optical means comprising a primary optical path for focusing infrared radiation from a scene onto said array of cryogenic detectors;

a beam splitter positioned in said primary optical path in front of said array of cryogenic detectors;

a temperature control means;

a projection heater for generating heat radiation therefrom that is temperature controlled by said temperature control means, wherein said projection heater is positioned to one side of said beam splitter at a distance from said beam splitter that is about the same as the distance of said array of cryogenic detectors from said beam splitter and further wherein the physical size of a heater surface which emits heat radiation from said projection heater is about the physical size of said array of cryogenic detectors whereby said heat radiation from said projection heater is projected onto said beam splitter in a geometrical size that masks cold spot radiation from said array of cryogenic detectors that is projected onto said beam splitter; and

a radiation trap positioned on the opposite side of said beam splitter from said projection heater wherein said radiation trap receives and completely dissipates the portion of said heat radiation that is transmitted through said beam splitter and wherein the remaining portion of said heat radiation is reflected off said beam splitter along the same cross-sectional area of said primary optical path as the cross-sectional area of said cold spot radiation along said primary optical path for masking said cold spot radiation from any black hole radiometer capable of detecting said cold spot radiation.

4,929,835

POSITION-SENSITIVE RADIATION DETECTOR

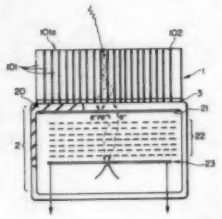
Takaji Yamashita, and Hiroshi Uchida, both of c/o Hamamatsu Photonics Kabushiki Kaisha, No. 1126-1, Ichino-cho, Hamamatsu-shi, Shizuoka, Japan

Filed Apr. 11, 1986, Ser. No. 850,775
Claims priority, application Japan, Apr. 12, 1985, 60-78929; May 28, 1985, 60-114790
Int. Cl.[5] G01T *1/202*
U.S. Cl. 250—367 **16 Claims**

2. A position-sensitive radiation detector comprising:

a scintillator plate comprising a plurality of scintillator elements formed from scintillator material having a high atomic number and having polished side surfaces, a roughly-ground incident end face for receiving incident radiation, and a polished output end face for emitting scintillation light in response to radiation incident upon said incident end face;

a light incident position detecting tube having a photocathode opposite to said output end faces for emitting photoelectrons in response to said scintillation light emitted from said output end faces of said plurality of scintillator elements, said photoelectrons being emitted from locations on said photocathode corresponding to the position of said scintillator elements in said plate which receive said radiation;



a photomultiplier for multiplying said emitted electrons;

an incident electron detecting unit for receiving said electrons from said photomultiplier and for outputting a position signal representing in two dimensions the generation position of said electrons emitted from said photocathode; and

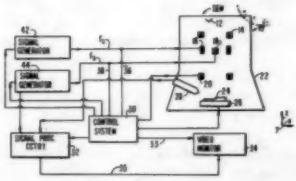
an arithmetic unit for processing said position signal to generate a distribution output indicating the position and intensity of radiation incident upon said scintillator plate.

4,929,836

FOCUSING IN INSTRUMENTS, SUCH AS SEMS AND CRTS

Albert Sicignano, Mount Kisco, and Mehdi Vaez-Iravani, Peekskill, both of N.Y., assignors to North American Philips Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 151,367, Feb. 2, 1988, Pat. No. 4,845,362. This application Apr. 3, 1989, Ser. No. 333,059
Int. Cl.[5] H01J *37/21*
U.S. Cl. 250—397 **4 Claims**



1. A method of image focusing comprising the steps of

directing an electron beam to a focus at an edge of an object surface,

generating a spatial differential signal by superimposing an oscillating local deflection field on said electron beam to optimize said focus at a variation of said object surface, and

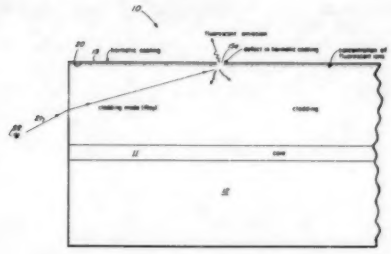
determining a minimum spot size of said electron beam.

4,929,837

METHOD FOR DETECTING PINHOLES AND INCOMPLETE COVERAGE OF HERMETIC COATINGS ON OPTICAL FIBER WAVEGUIDES

Sam DiVita, West Long Branch, N.J., and Howard E. Rast, Jr., Solana Beach, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 23, 1987, Ser. No. 29,125
Int. Cl.[5] G01N *21/64, 21/88*
U.S. Cl. 250—461.1 **13 Claims**



13. A method of detecting the coverage of a hermetic coating over a member having light transmissive properties comprising:

providing a fluorescent material in the member;

exciting the fluorescent material to emit fluorescence in response to energy radiated in a cladding mode; and

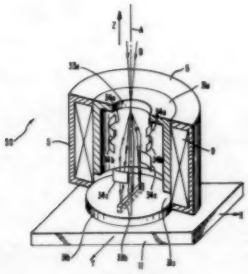
detectiing levels of emitted fluorescence along the length of the member to indicate where the hermetic coating is incomplete and where the hermetic coating has pinholes.

4,929,838

MAGNETIC OBJECT LENS FOR AN ELECTRON BEAM EXPOSURE APPARATUS WHICH PROCESSES A WAFER CARRIED ON A CONTINUOUSLY MOVING STAGE

Hiroshi Yasuda, Yokohama, Japan, and Masahiko Suzuki, deceased, late of Aichi, Japan (by Yoshikazu Suzuki, Fumie Suzuki, heirs), assignors to Fujitsu Limited, Kawasaki, Japan

Filed Feb. 14, 1989, Ser. No. 310,347
Claims priority, application Japan, Feb. 16, 1988, 63-033088
Int. Cl.[5] H01J *37/30*
U.S. Cl. 250—492.2 **23 Claims**



1. An electron beam exposure apparatus for projecting an electron beam onto an object which is continuously moving in a moving direction, by scanning the electron beam in a predetermined scanning space extending in a scanning direction, comprising:

a movable stage having a surface for supporting the object, said stage being substantially continuously movable in the moving direction;

a magnetic lens system including:

means for emitting electrons;

means for focusing the electrons into an electron beam, said focusing means having a magnetic object lens comprising:

a coil for generating magnetic flux;

an upper pole piece made of magnetic material and positioned adjacent said coil; and

a lower pole piece made of magnetic material, positioned adjacent said coil and disposed to face the object, said lower pole piece having an opening coincident with the predetermined scanning space of the electron beam, the electron beam passing through said opening, said lower pole piece substantially preventing magnetic flux generated by said lens from reaching said stage; and

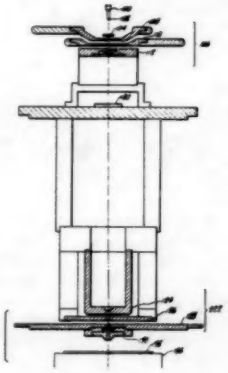
means for deflecting the electron beam.

4,929,839

FOCUSED ION BEAM COLUMN

Norman W. Parker, Westlake Villiage, and William P. Robinson, Newbury Park, both of Calif., assignors to MicroBeam Inc., Newbury Park, Calif.

Filed Oct. 11, 1988, Ser. No. 256,005
Int. Cl.[5] H01J *37/08*
U.S. Cl. 250—492.3 **2 Claims**



1. A focused ion beam column capable or operation over a wide range of final beam voltages, wherein the particular operating range can be changed by a sample modification of the column design, where a large working distance between the column and target surface allows for installation of imaging and/or charge neutralization optics, and comprising:

a high intensity ion source for emitting a first ion beam along the optical axis of said column, wherein said first ion beam may contain a plurality of ion species,

a first electrode adjacent to said ion source for extracting ions from said ion source,

a target onto which said ion beam is to be focused and scanned in a controlled manner,

a beam-defining aperture for determining the acceptance angle of said ions into the portion of the column beyond said aperture,

an upper focusing means for imaging said ion source into an intermediate crossover, and wherein the exit beam voltage relative to said ion source is kept constant and is substantially increased over the entrance beam voltage, independent of variations in said entrance beam voltage,

a lower focusing means for imaging said intermediate cross-

over onto the surface of said target, wherein the entrance beam voltage relative to said ion source is kept constant end equal to said exit voltage from said upper focusing means, and the exit beam voltage is higher, lower, or equal to said entrance beam voltage, depending on the requirements for the final beam energy, said lower focusing means comprising an electrostatic round lens having first, second, and third electrodes, wherein the third electrode of said electrostatic round lens is movable in the x-y directions transverse to said optical axis to align said third electrode with the first and second electrodes of said electrostatic round lens,

a constant high voltage enclosure between the exit of said upper focusing means and the entrance of said lower focusing means, wherein the beam voltage relative to the ion source is constant and equal to said exit voltage from said upper focusing means,

a main deflector means for deflecting said ions in a controlled manner across said target surface.

4,929,840

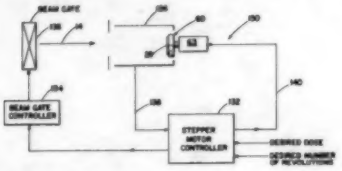
WAFER ROTATION CONTROL FOR AN ION IMPLANTER

Jerald P. Dykstra, and Andrew M. Ray, both of Austin, Tex., assignors to Eaton Corporation, Cleveland, Ohio

Filed Feb. 28, 1989, Ser. No. 317,226

Int. Cl.[5] H01J *37/08*

U.S. Cl. 250—492.3 **6 Claims**



1. In an ion implanter comprising a vacuum chamber, wafer-receiving support means within said vacuum chamber, means for directing a beam of ions onto a wafer received on said support means, said support means maintaining said wafer in position to continuously intercept said beam of ions, and means for rotating said support means in discrete steps about an axis coinciding with an axis normal to and intersecting the surface of a wafer received on said support means; means for controlling the dose implanted in said wafer comprising means for measuring the dose of ions implanted in a wafer received on said support means, means for interrupting the beam of ions received by the wafer, and control means operable to receive dose information signals from said dose measuring means and to transmit signals to said rotating means to provide stepwise rotation of said support means in response to said dose information signals.

4,929,841

DYNAMIC INFRARED TARGET

David B. Chang, Tustin, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Sep. 26, 1988, Ser. No. 249,143

Int. Cl.[5] G02F *2/00*

U.S. Cl. 250—504 R **15 Claims**

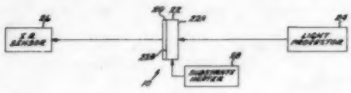
1. A dynamic infrared target system for producing desired infrared images, comprising:

an image light projector for projecting a light image representative of a desired infrared image; and

an infrared target comprising:

(i) a substrate transparent to infrared radiation and disposed with respect to said projected light image so that said light image impinges on a first surface of said substrate; and

(ii) a thin film of a photo-conductive material formed on a second surface of said substrate and having a thickness



comparable to the skin depth of the infrared wavelength of interest;

whereby said light image impinges on said thin film photo-conductive material and causes a change in emissivity to occur in said thin film material.

4,929,842

ELECTRO-OPTICAL MEASURING AND TRANSMISSION DEVICE USING OVERLOAD AND OVERVOLTAGE PROTECTION CIRCUITS

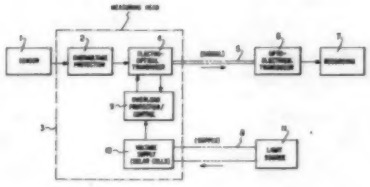
Jan L. ter Haseborg, Buchholz; Joachim Nedwig, Ulm, and Klaus-Dieter Kruse, Vögelsen, all of Fed. Rep. of Germany, assignors to Licentia Patent-Verwaltungs GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed May 12, 1989, Ser. No. 352,547

Claims priority, application Fed. Rep. of Germany, Jul. 15, 1988, 8809093[U]

Int. Cl.[5] G02B *27/00*

U.S. Cl. 250—551 **11 Claims**



1. An electro-optical measuring and transmitting device comprising:

a signal input configured for receiving electrical signals from a sensor responsive to an electromagnetic field;

a signal output for providing signals to a signal receiving device;

an electro-optical transducer connected to said signal input for evaluating said signals and providing a corresponding light signal at said signal output,

a voltage supply for providing an operating voltage for said transducer;

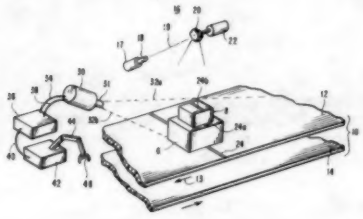
an overload protection circuit connected between said voltage supply and said transducer; and

an overvoltage protection circuit, connected between said signal input and said transducer, for protecting said transducer from excessive voltage signals.

4,929,843
APPARATUS AND METHOD FOR DETERMINING A DIMENSION OF AN OBJECT

Thomas A. Chmielewski, Jr., Southampton Township, Bucks County, Pa., and Richard J. Tarzaiski, Magnolia Borough, Camden County, N.J., assignors to General Electric Company, Morrestown, N.J.

Filed Jun. 28, 1989, Ser. No. 372,580
Int. Cl.[5] G01N *21/86*; G01B *11/24*; H04N *7/18*
U.S. Cl. 250—561 **21 Claims**



1. A method for determining the centroid of an imaged feature, comprising the steps of:

generating line scan digital video representative of the feature, in which said feature extends over several adjacent pixels in the line scan direction;

storing the magnitude of the historic maximum value of said digital video under the control of a strobe; continually comparing a current value of said digital video with the stored historic maximum value, and generating said strobe when said current value exceeds said stored historic value, whereby said stored historic value is updated to represent the current value at the occurrence of each strobe;

multiplying the values of each of selected pixels of said digital video by a predetermined constant to produce first products, and summing said first products to produce a sum-of-intensities signal, said selected pixels being adjacent that pixel representing said historic maximum;

multiplying said values of each of said selected pixels by a selected multiplier to thereby produce second products, the values of said selected multipliers being monotonically related to the positions of the associated selected pixels, and summing said second products to produce a sum-of-weighted intensities signal; and

transmitting said sum-of-intensities and sum- o of-weighted intensities signals to a ratio calculator;

in response to the beginning of each said line scan, initiating pixel-rate counting;

in response to said strobe, storing the count resulting from said pixel-rate counting, to produce a position signal representative of the position of the pixel at which said historic maximum occurs; and

transm...ing said position signal representing the position of the pixel at which historic maximum value occurs.

4,929,844
APPARATUS FOR DETECTING THE PRESENCE AND SIZE OF A DOCUMENT

Yuji Houjiyou, Hashima; Hiroyuki Hayasaki, Ogaki, and Kyoichi Yonezawa, Tottori, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

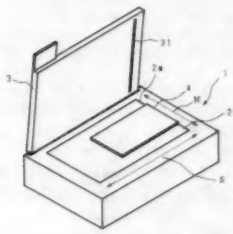
Filed Nov. 18, 1988, Ser. No. 272,957
Claims priority, application Japan, Nov. 20, 1987, 62-294857
Int. Cl.[5] G01N *21/86*
U.S. Cl. 250—561 **15 Claims**

1. A reading apparatus which automatically detects the presence or absence of a document on a document table, comprising;

a light source which illuminates said document table;

a collecting means which collects information about light intensity of said document table;

a comparing means which compares said information when said light source is off with that when said light source is on; and

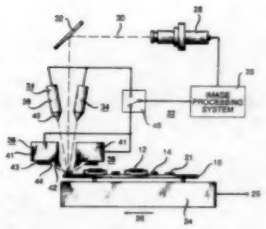


means for determining the presence or absence of a document on said document table in accordance with the result of comparison executed by said comparing means.

4,929,845
METHOD AND APPARATUS FOR INSPECTION OF SUBSTRATES

Israel Amir, and Frank P. Higgins, both of Ewing, N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Feb. 27, 1989, Ser. No. 316,004
Int. Cl.[5] G01N *21/86*
U.S. Cl. 250—561 **7 Claims**



1. A method of fabricating a substrate comprising the steps of:

placing at least one of a first type and at least one of a second type of component, having electrically conductive members, on a substrate so that each of the components has its conductive members in registration with corresponding metallized areas on the substrate;

adhering the first and second types of components to the substrate; and

soldering the conductive members of the components to the substrate, characterized in that prior to the soldering step, the substrate is inspected to detect whether any of the first and second types of components are missing or misaligned, the inspection being accomplished by the steps of:

(a) illuminating the substrate with top light by directing light at the surface of the substrate so the light strikes the board substantially normal to the plane of the substrate surface to enhance the image of the conductive members of the first type of component;

(b) capturing, with a linescan camera, the image of a thin strip of area running across the surface of the substrate;

(c) imparting a relative motion between the substrate and the linescan camera so the camera captures the image of successive strips of surface area running across the board;

(d) storing the captured images for subsequent processing to

determine if any of the first type of component are missing or misaligned;

(e) illuminating the substrate with side light by directing light at the substrate at a grazing angle wth respect to the surface to enhance the image of the conductive members on the second type of component;

(f) imparting a relative motion between the substrate and the linescan camera so the camera captures the image of successive strips of surface area running across the substrate; and

(g) storing the captured images for subsequent processing to determine if any of the second type of component are missing or misaligned.

4,929,846

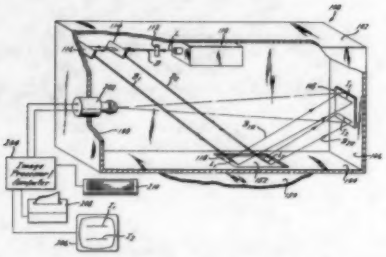
SURFACE QUALITY ANALYZER APPARATUS AND METHOD

Tahir M. Mansour, Livonia, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Oct. 5, 1988, Ser. No. 253,453

Int. Cl.[5] G01N *21/86*

U.S. Cl. 250—571 **36 Claims**



1. An apparatus for simultaneously projecting a pair of light beams onto a test surface and imaging the reflected beams or quality analysis, comprising

means for generating a collimated beam of monochromatic light energy;

means for diverging said collimated beam in a single plane, splitting said diverging beam into at least one pair of beams and directing said beams towards said test surface;

means providing a housing for mounting said generating means and said diverging, splitting and directing means in a predetermined orientation and including an opening through which said beams can impinge upon a test surface located adjacent said housing;

screen means located within said housing for imaging the monochromatic light reflected from said test surface; and

means for recording the images on said screen means and analyzing the recorded images to categorize the quality of the test surface against predetermined levels of quality.

4,929,847

RAPID DETERMINATION OF SLUDGE CONTENT AND DEVICE THEREFOR

Seigo Yamazoe; Sadao Nakai, and Yukimasa Fukui, all of Saitama, Japan, assignors to Cosmo Oil Co., Ltd., Tokyo, Japan

Filed May 4, 1989, Ser. No. 348,742

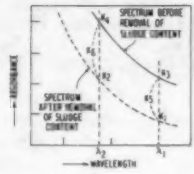
Claims priority, application Japan, May 9, 1988, 63-110512; Nov. 1, 1988, 63-274383

Int. Cl.[5] G01N *15/06*

U.S. Cl. 250—573 **10 Claims**

1. A method for determining a sludge content in a heavy hydrocarbon oil, which comprises the steps of:

(A) measuring absorbances of a heavy hydrocarbon oil sample having an oil film thickness of from about 0.01 to 5 mm at two different wavelengths selected from the visible light region of from 500 to 1000 nm; and



(B) determining a sludge content of the sample by comparing the two measured absorbances according to the relationship between known sludge contents and absorbances at the two wavelength.

4,929,848

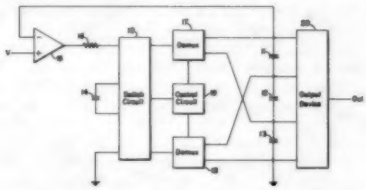
HIGH ACCURACY REFERENCE LADDER

Zdzislaw Gulczynski, P.O. Box 441, Winchester, Mass. 01890

Filed Jan. 31, 1989, Ser. No. 304,510

Int. Cl.[5] H03K *3/53*; G06F *1/00*

U.S. Cl. 307—246 **11 Claims**



1. Reference apparatus for providing reference signals, comprising:

an input capacitive means for storing a base signal;

a source means for charging the input capacitive means;

a switch means having outputs, for coupling the input capacitive means to these outputs or to the source means;

an output capacitive means having a plurality of terminals for providing the reference signals; and

a selective means for selecting at least a pair of the output capacitive means terminals and coupling the switch means outputs thereto.

4,929,849

NOISE SUPPRESSION IN RECOVERY OF CLOCK FROM NRZ DATA

Christopher R. Paul, Bayport, N.Y., assignor to Coherent Communications Systems Corp., Hauppauge, N.Y.

Filed Dec. 9, 1988, Ser. No. 283,148

Int. Cl.[5] H03K *5/08, 5/153*

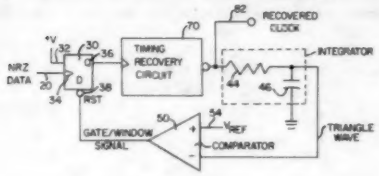
U.S. Cl. 307—269 **11 Claims**

1. A clock generator for extracting a clock signal from a data signal, comprising:

a timing recovery circuit operable to produce a recovered clock signal substantially synchronized with transitions occurring at an input to said timing recovery circuit, the timing recovery circuit being operable to seek and find a constant phase relationship between the data signal and the recovered clock signal during phase excursions of the data signal;

a triangle wave generator responsive to the recovered clock signal, the triangle wave generator producing a triangle wave from the recovered clock signal;

a comparator operable to compare the triangle wave to a reference voltage, and to produce an output at one of two discrete levels as a function of relative levels of the triangle wave and the reference voltage; and,



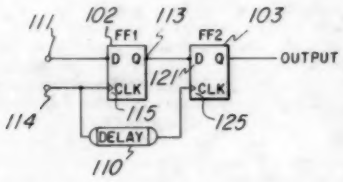
a gate operable to generate a data transition flag which is supplied to the timing recovery circuit only when the comparator output is at one of said two levels, thereby defining a gate window, the gate window defining a maximum phase excursion for valid transitions in the data.

4,929,850

METASTABLE RESISTANT FLIP-FLOP

Robert K. Breuninger, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Sep. 17, 1987, Ser. No. 98,093
Int. Cl.[5] H03K *3/284, 17/16*
U.S. Cl. 307—272.1 **5 Claims**



1. A circuit comprising: a first flip-flop circuit having, clock and output terminals;

a second flip-flop circuit having input, clock and terminals;

each of said flip-flops having stable high and stable low logic states and each having propagation and set up times;

the output terminal of the first flip-flop connected to the input terminal of the second flip-flop; and

a clock delay connected between the first clock terminal and the second clock terminal for delaying a clock input received at the first clock terminal a predetermined time;

wherein the sum of the propagation time of the first flip-flop and the set up time of the second flip-flop is less than the clock delay.

4,929,851

DATA LIMITER FOR A RADIO PAGER

Gary L. Pace, Boca Raton, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

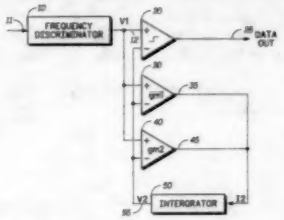
Filed Jan. 23, 1989, Ser. No. 299,180
Int. Cl.[5] H03K *5/08*
U.S. Cl. 307—359 **25 Claims**

1. A data limiter, comprising:

comparison means having a first input for receiving a first signal and a second input for receiving a reference signal;

first and second transconductance amplifiers, each having a first input coupled to receive said first signal, a second input coupled to receive said reference signal, and an output, each amplifier having a respective predetermined input offset voltage; and

an integrator having an input coupled to the outputs of said first and second transconductance amplifiers and an output coupled to the second input of said comparison means



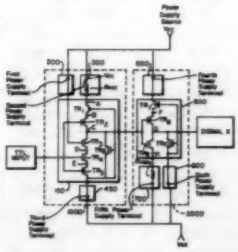
and to the second inputs of each of said first and second amplifiers to provide said reference signal.

4,929,852

TTL TO CMOS INPUT BUFFER CIRCUIT

Myung H. Bae, Songtan, Rep. of Korea, assignor to Samsung Semiconductor & Telecommunications Co., Gumi, Japan

Filed Jul. 29, 1988, Ser. No. 225,848
Claims priority, application Rep. of Korea, Aug. 1, 1987, 87-8475
Int. Cl.[5] H03K *19/094*
U.S. Cl. 307—475 **11 Claims**



1. A TTL to CMOS input buffer comprising:

a first buffer receiving a TTL input signal and a second buffer receiving an input from said first buffer and providing a CMOS output signal;

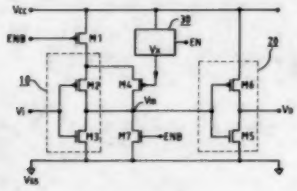
said first buffer having first, second, and third power supply inputs; said first power input of said first buffer is connected to a source Vcc; said second power input of said first buffer is connected through a resistor to a source Vcc; and said third power input of said first buffer is connected to a source Vss; and

said second buffer having a first, second, and third power supply inputs; said first power input of said second buffer is connected to a source Vcc; said second power input of said second buffer is connected through a resistor to a source Vss; and said third power input of said second buffer is connected to a source Vss.

4,929,853
INPUT TRANSLATING CIRCUIT FOR CMOS DEVICE

Byeng-yun Kim, Seoul, and Yong-bo Park, Busan, both of Rep. of Korea, assignors to Samsung Electronics, Co., Ltd., Kyunggi, Rep. of Korea

Filed Apr. 25, 1989, Ser. No. 342,923
Claims priority, application Rep. of Korea, Jul. 19, 1988, 88-9009
Int. Cl.[5] H03K *19/094;* **G06F** *7/38*
U.S. Cl. 307—475 **6 Claims**



1. An input translating circuit for a CMOS device comprising:

a first p-channel MOS transistor (M1) for receiving inverted enable signals ENB at a gate thereof;

a first CMOS inverting means (10) comprising a second p-channel MOS transistor (M2) having a source for receiving a supply voltage through said first p-channel MOS transistor M1, and a first n-channel MOS transistor (M3) having a grounded source, external input signals of a TTL level applied to a first connection node of the gates of said second p-channel and first n-channel MOS transistors (M2) and (M3), the connection node of drains of said transistors (M2) and (M3) serving as a first output terminal;

a second CMOS inverting means (20) comprising a third p-channel MOS transistor (M6) having a source for receiving a supply voltage, and a second n-channel MOS transistor (M5) with a grounded source, said first output terminal of said first CMOS inverting means (10) connected to a second connection node comprising the gates of said third p-channel and said second n-channel MOS transistors (M6) and (M5); the connection node of drains of said transistors (M6) and (M5), serving as an second output terminal;

a third grounded source n-channel MOS transistor M7 with inverted enable signals (ENB) applied to its gate, its drain connected to said second connection node of said second CMOS inverting means (20);

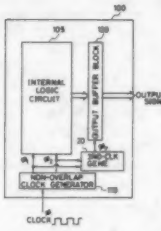
a fourth p-channel MOS transistor (M4) having a drain and a source connected respectively to a drain and a source of said second p-channel MOS transistor (M2) of said first CMOS inverting means (10);

a supply voltage level discrimination means (30) including a voltage dividing means (31) for producing a predetermined supply voltage, and a level comparing means (32) for comparing the predetermined voltage produced from said supply voltage level discrimination means (31) with the reference voltage to produce a control voltage (Vx) for said fourth p-channel MOS transistor (M4); said supply voltage level discrimination means (30) turning on or off said fourth p-channel MOS transistor (M4) in correspondence with the level of the supply voltage, wherein the geometrical aspect ratio $(W/L)_1$ of the first p-channel MOS transistor (M1) is made to be sufficiently larger than the geometrical aspect ratios $(W/L)_2$ and $(W/L)_4$ of said second and fourth p-channel MOS transistors (M2) and (M4) connected in parallel.

4,929,854
CLOCK CIRCUIT HAVING A CLOCKED OUTPUT BUFFER

Hideyuki Iino, Yokohama; Akihiro Yoshitake, Kawasaki, and Hidenori Hida, Yokohama, all of Japan, assignors to Fujitsu Limited and Fujitsu Microcomputer Systems Limited, both of Kawasaki, Japan

Filed Apr. 10, 1989, Ser. No. 335,260
Claims priority, application Japan, Apr. 15, 1988, 63-93837
Int. Cl.[5] H03K *19/096*
U.S. Cl. 307—480 **14 Claims**



1. A semiconductor integrated circuit device comprising:

internal logic means for carrying out a logic operation and generating an output signal based on said logic operation;

output buffer means, connected to said internal logic means, for outputting said output signal through an output terminal in synchronism with a clock signal;

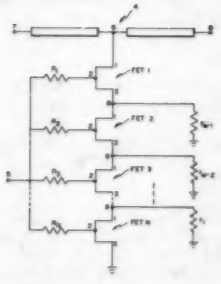
first means for generating a first internal clock signal which falls in synchronism with a falling edge of an external clock signal and for generating a second internal clock signal which falls in synchronism with a rising edge of said external clock signal, said internal logic means carrying out said logic operation in synchronism with said first and second internal clock signals; and

second means, connected to said first means, for generating a third internal clock which rises in synchronism with the falling edge of said second internal clock signal and which falls in synchronism with the falling edge of said first internal clock signal, said third internal clock signal being supplied, as said clock signal, to said output buffer means.

4,929,855
HIGH FREQUENCY SWITCHING DEVICE

Amin K. Ezzeddine, Plainsboro, N.J., assignor to Grumman Corporation, Bethpage, N.Y.

Filed Dec. 9, 1988, Ser. No. 281,764
Int. Cl.[5] H03K *17/60*
U.S. Cl. 307—571 **10 Claims**



1. A high frequency switch comprising:

at least two field-effect transistors, each including a control electrode and two other electrodes, connected to each other in series between a high frequency electric signal source and reference potential means for providing a reference potential, said two other electrodes of said at least two field effect transistors forming the series connection between said transistors;

first means for biasing the control electrode of each of said transistors to cause components of an electric signal which exceed a threshold frequency to flow from said electric signal source to said reference potential means through a channel between said two other electrodes of each of said transistors, said first means having an impedance which is high compared to the internal impedances of said transistors; and

second means connected between each junction of said series connection of said at least two transistors and said reference potential means for establishing an impedance between each junction of said series connection and said reference potential which is high compared to the internal impedances of said transistors.

4,929,856

HEAVY-DUTY CIRCUIT BREAKER

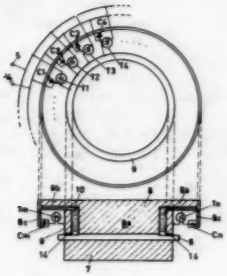
Horst Güning, Baden, Switzerland, assignor to Asea Brown Boveri AG, Baden, Switzerland

Filed Jan. 26, 1989, Ser. No. 301,828

Claims priority, application Switzerland, Jan. 26, 1988, 262/88-3

Int. Cl.[5] H03K *17/72*

U.S. Cl. 307—633 **8 Claims**



1. Heavy-duty circuit breaker comprising:

(a) a semiconductor component which can be turned off via a gate, and

(b) a control unit (AS) which generates the gate current necessary for turn off:

wherein

(c) the control unit (AS) is divided into a plurality of sub units (AS1, . . . , ASn) operating in parallel, which in each case generate a part of the gate current necessary for the turn off;

wherein

(d) the turn-off-type semiconductor component exhibits a gate electrode (14) which is arranged to be spatially distributed; and

(e) the sub units are connected at various places of the spatially distributed gate electrode (14).

4,929,857

ELECTRIC STARTER WITH BIASED FULCRUM

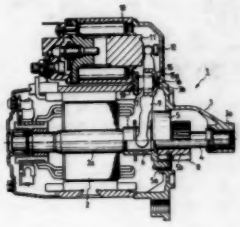
Shuzoo Isozumi, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 28, 1989, Ser. No. 344,793

Claims priority, application Japan, Jun. 22, 1988, 63-155842

Int. Cl.[5] H02K *7/118*; H01H *9/02*

U.S. Cl. 310—83 **4 Claims**



1. An electric starter comprising: a dc motor;

a front bracket integrally conjoined to a front end of an armature shaft of said dc motor;

an output rotary shaft which is rotated by the armature shaft of the dc motor;

an overrunning clutch fitted on said output rotary shaft so that said clutch is slidable in the axial direction thereof;

a splined tube coupled to an outer member of said clutch and engaged with a helical spline integrally formed on said output rotary shaft so as to transmit the torque of said output rotary shaft to said outer member of said clutch;

a shift lever engaged at a lower end thereof with a peripheral portion of said splined tube end at an upper end thereof with an actuator of an electromagnetic switch provided at a peripheral portion of the dc motor, so that said lever is swingable about a fulcrum portion thereof, said fulcrum portion being shaped as a hollow cylindrical body, the bottom of the inside of which is being shaped as an arc;

a holder having a surface curved to correspond to the arc-shaped bottom of the inside of said fulcrum portion, said holder being provided in said fulcrum portion so that said curved surface is in contact with said bottom; and

a spring provided on said holder so that said fulcrum portion is pushed toward a support projection of said front bracket.

4,929,858

STARTER WITH OVERRUNNING CLUTCH AND BALANCED ARMATURE

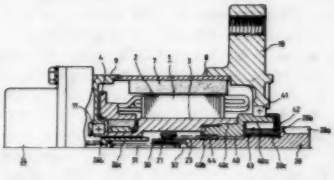
Kelichi Konishi, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 19, 1989, Ser. No. 354,562

Claims priority, application Japan, Jun. 13, 1988, 63-145169

Int. Cl.[5] H02K *7/10*; F16D *23/00*

U.S. Cl. 310—83 **4 Claims**



1. A starter comprising:

an electric motor which produces torque for starting an engine and has a hollow armature shaft;

a one-way clutch having an outer member and a hollow inner member said outer member being engaged with said armature shaft;

a pinion shaft which is provided with a pinion capable of being engaged with the ring gear of said engine and is engaged with the inside of said inner member by splines so that said pinion shaft is movable in the axial direction thereof;

an electromagnetic switch for applying electricity to said motor and moving said pinion shaft in the axial direction thereof;

a bearing supporting a rear end of said armature shaft;

a cover supporting said outer member in such a manner that said outer member is rotated together with the hollow armature shaft of said motor; and

roller means provided between said outer member and said hollow inner member at positions surrounding said hollow inner member and operative to rotatably support a portion of said outer member.

4,929,859

PIEZOELECTRIC ACTUATOR HAVING PARALLEL ARRANGEMENT OF A SINGLE PIEZOELECTRIC ELEMENT AND A PAIR OF DISPLACEMENT MAGNIFICATION ARMS

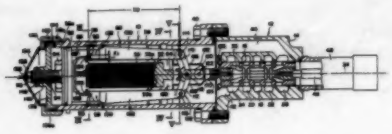
Toshitake Suzuki, Susono; Norio Komoda, Gotenba; Susumu Oda, Toyota, and Motoo Harata, Nagoya, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Dec. 12, 1988, Ser. No. 283,386

Claims priority, application Japan, Dec. 25, 1987, 62-328644; Dec. 25, 1987, 62-197229; Dec. 25, 1987, 62-197230

Int. Cl.[5] H01L *41/08*

U.S. Cl. 310—328 16 Claims



1. A piezoelectric actuator comprising an output member to reciprocate along a central axis, a piezoelectric element aligned substantially along said central axis, a retainer structure supporting a first end of said piezoelectric element, a first displacement magnification mechanism having a pair of arms each having a first end and a second end and pivotably supported on said retainer structure at an intermediate portion thereof via an elastic integral hinge, said first ends of said arms each abutting a second end of said piezoelectric element opposite to said first end thereof, a second displacement magnification mechanism having a pair of links pivotably connected at first ends thereof respectively with said second ends of said arms and pivotably connected with said output member at second ends thereof opposite to said first ends thereof, a housing enclosing said retainer structure with said first displacement magnification mechanism, and means for adjustably fastening said retainer structure to said housing so that said retainer structure is adjustably shiftable relative to said housing along said central axis, wherein said housing is a substantially cylindrical housing having a longitudinal axis aligned with said central axis.

4,929,860

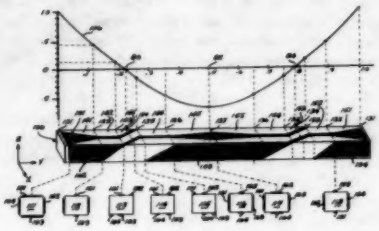
ELECTRODE CONFIGURATION FOR VIBRATING BEAM TRANSDUCERS

Rand H. Hulsing, II, Redmond, and Mitchell Novack, Kirkland, both of Wash., assignors to Sundstrand Data Control, Inc., Redmond, Wash.

Filed May 17, 1988, Ser. No. 194,806

Int. Cl.[5] H01L *41/08*

U.S. Cl. 310—366 11 Claims



1. A transducer comprising a substantially solid piezoelectric beam having a natural resonant frequency and a longitudinal axis that extends between two opposed clamped ends; and a plurality of electrodes mounted by the beam for causing the beam to vibrate by producing forces directed along the longitudinal axis, at least one of the electrodes defining means for increasing the tendency of the beam to vibrate in a predetermined flexure mode at the natural resonant frequency, to the exclusion of harmonic frequencies, said means comprising a configuration of said at least one electrode that varies as a function of longitudinal position along the beam such that when a voltage difference is applied between the electrodes, the longitudinal force produced by the electrodes as a function of longitudinal position, approximates a longitudinal strain versus longitudinal position profile of the predetermined flexure mode at the natural resonant frequency.

4,929,861

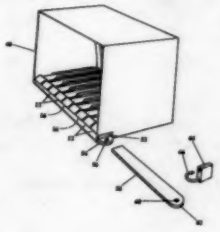
QUICK RELEASE LATCHING AND DISPENSING DEVICE

Darrell J. Metcalf, 520 First St., Fillmore, Calif. 93015

Filed Dec. 19, 1988, Ser. No. 286,150

Int. Cl.[5] B65D *85/672*

U.S. Cl. 312—18 28 Claims



1. Storage means for storing and retrieving articles, said storage means including at least one latching means for releasably retaining said articles, (The latching means of claim 2 wherein:)

a base member,

a resilient lever portion projecting forwardly from said base member and formed with a latching projection extending upwardly adjacent the forward end of said lever portion

to releasably retain an article on said latching means when said lever portion is in its normal raised position,

resilient means located adjacent the rear end of said base member and operable to eject an article from said base member when said lever portion is depressed, and

lock means movable into and out of a position to prevent depression of said lever to prevent unauthorized removal of articles from said latching means,

said base member (is) being formed with a projection extending forwardly below said lever portion, and

said lock means (is) being pivotally mounted on said projection and (is) movable into and out of a position to block depression of said lever portion.

4,929,862

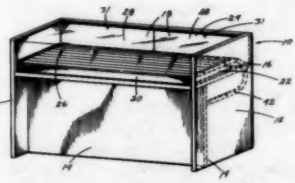
SECURITY SHIELD FOR DISPLAY CASES

Gregory C. Hamilton, and Danielle R. Hamilton, both of P.O. Box 2261, Chico, Calif. 95927

Continuation-in-part of Ser. No. 209,007, Jun. 20, 1988, abandoned. This application Jan. 25, 1989, Ser. No. 302,051

Int. Cl.[5] A47F *3/00*

U.S. Cl. 312—138.1 **10 Claims**



1. A display case comprising a glass top, a front panel, a pair of side panels, and a display tray shelf attached to the said panels directly below said glass top;

said display tray shelf having a shield passage opening formed therein;

a U-shaped track attached to each side panel in such a way that each said U-shaped track passes through the said shield opening in the display tray shelf so that a portion of each said U-shaped track appears above the tray shelf and another portion of each said U-shaped track appears below the tray shelf, said U-shaped tracks each opened along one full side with lipped grooves;

means for mounting said U-shaped tracks to the side panels with said U-shaped tracks in parallel alignment and said lipped grooves interfaced;

a plurality of slats, each said slat having means that hingedly connect the slats longitudinally together to form a flexible shield panel;

said flexible shield panel having means for attaching the shield panel to the U-shaped tracks and allows the shield panel to move along said U-shaped tracks between an on-top protective position covering said display tray shelf to a storage position which is below the display tray shelf, said flexible shield panel passing through the shield passage opening when moving from the protective position to the storage position;

and means for locking said flexible shield panel when in said protective position.

4,929,863

HIGH-PRESSURE GAS DISCHARGE LAMP AND LUMINAIRE PROVIDED WITH SAID LAMP

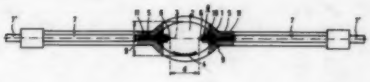
Willibrordus G. C. Verbeek, Turnhout; Hendrik Wijbenga, and Marie-Madelene Vossen-Bergmans, both of Eindhoven, all of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 26, 1988, Ser. No. 237,341

Claims priority, application Netherlands, Sep. 4, 1987, 8702086

Int. Cl.[5] H01J *61/073, 61/20*

U.S. Cl. 313—113 **16 Claims**



1. A high pressure gas discharge lamp, comprising:

a lamp vessel enclosing an ovoidal discharge space defining a major axis of said lamp, said discharge space having a largest diameter D transverse to the major axis;

a pair of opposing electrodes disposed in said discharge space, each electrode comprising an electrode rod extending from said lamp vessel along the major axis and terminating at a tip end and an electrode coil on said electrode rod spaced from said tip end,

said tip ends of said electrode rods being spaced a distance d between 15 and 30 mm and said discharge space having largest diameter D chosen such that $0.75 \leqq d/D \leqq 1.25$;

said discharge space having an ionizable filling comprising mercury, a rare gas, and bromine and iodine rare earth halides, the ratio between bromine and iodine atoms being between 1.5 and 4;

a pair of current-supply conductors, each connected to a respective electrode rod and extending through the lamp vessel to the exterior in a gas-tight manner; and

said lamp consuming during normal lamp operation a power between 1600 and 2000 Watts.

4,929,864

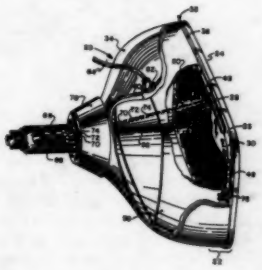
NI-BASED FTM SHADOW MASKS HAVING A NICKEL PHOSPHIDE BLACK LAYER

Hua Sou Tong, Mundelein, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.

Continuation-in-part of Ser. No. 127,724, Dec. 7, 1987, abandoned. This application Mar. 13, 1989, Ser. No. 308,904

Int. Cl.[5] H01J *29/07*

U.S. Cl. 313—402 **8 Claims**



1. For use in a color cathode ray tube having a flat faceplate, a shadow mask comprising a nickel-iron-based apertured foil, said foil having a thin surface layer of a nickel phosphide compound to increase its emissivity, said nickel of said surface layer of nickel phosphide being provided from the nickel of an

iron-depleted surface region of said nickel-iron-based apertured foil.

4,929,865

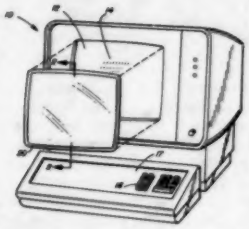
EYE COMFORT PANEL

Jerome V. Blum, Los Altos Hills, Calif., assignor to Visual Ease, Inc., Los Altos Hills, Calif.

Continuation-in-part of Ser. No. 8,514, Jan. 29, 1987, abandoned. This application Mar. 9, 1989, Ser. No. 321,632

Int. Cl.[5] H01J 29/89

U.S. Cl. 313—478 10 Claims



1. An eye comfort device for optically adjusting the focal distance for screen viewing of a video display comprising a transparent plate constituting a lens with a diopter vergence value in the range of from 0.4 to 0.8 diopters.

4,929,866

LIGHT EMITTING DIODE LAMP

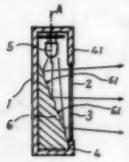
Hiroaki Murata; Teruhisa Inomata, and Masatoshi Tabira, all of Itamishi, Japan, assignors to Mitsubishi Cable Industries, Ltd., Amagasaki, Japan

Filed Nov. 7, 1988, Ser. No. 267,852

Claims priority, application Japan, Nov. 17, 1987, 62-290139; Dec. 29, 1987, 62-336314

Int. Cl.[5] H01J 5/16; G09F 13/18

U.S. Cl. 313—500 7 Claims



1. A light emitting diode lamp comprising: a case;

a plurality of light emitting diodes disposed within said case;

a window forming a part of said case and having at least one window frame, said window allowing light emitted from said plurality of light emitting diodes to pass therethrough, said plurality of light emitting diodes being secured at a corner of said window and behind said window frame;

light reflector means having a plurality of light reflecting faces for dividing and reflecting said light from said plurality of light emitting diodes, and

light-scattering means for scattering said light from said light reflector means to thereby have said light substantially uniformly pass through said window.

4,929,867

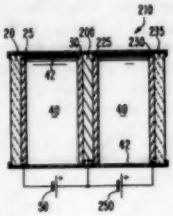
TWO STAGE LIGHT CONVERTING VACUUM TUBE

Kenneth A. Costello, and Hugh F. MacMillan, both of Palo Alto, Calif., assignors to Varian Associates, Inc., Palo Alto, Calif.

Filed Jun. 3, 1988, Ser. No. 202,640

Int. Cl.[5] H01J 40/06

U.S. Cl. 313—525 1 Claim



1. A vacuum tube comprising at least two stages and further comprising,

an input photocathode in the first stage of said vacuum tube for receiving photons from outside of said vacuum tube and converting them into electrons to be released into a first stage vacuum portion of said tube,

means within the first stage of said vacuum tube for accelerating said electrons emitted from said photocathode,

a first stage output screen within the first stage of said vacuum tube for receiving said accelerated electrons and converting the electron energy into photons,

a second stage photocathode for converting the photons emitted by said first stage output screen into electrons which are released into a second stage vacuum portion of said tube,

wherein said first stage output screen and said second stage photocathode comprise single crystal III–V semiconductor compounds and said first stage output screen and said second stage photocathode are on opposite sides of and lattice matched to a support member comprising a III–V semiconductor compound.

4,929,868

GLOW DISCHARGE LAMP CONTAINING NITROGEN

Andre C. Bouchard, Peabody, Mass., assignor to GTE Products Corporation, Danvers, Mass.

Filed Jan. 5, 1989, Ser. No. 295,611

Int. Cl.[5] H01J 61/16, 61/64

U.S. Cl. 313—619 16 Claims

1. A negative glow discharge lamp comprising:

a light transmitting envelope containing a gas fill material at a low pressure including at least one noble gas and nitrogen, said nitrogen being in an amount from 1.5 percent to less than 10 percent of the total fill material, said nitrogen

being effective to increase lamp efficiency without adversely affecting the starting characteristics of said lamp,

a pair of electrodes disposed in said envelope and exposed to said gas fill material, and

lead-in wires coupled to the electrodes and extending through and hermetically sealed in said envelope.

4,929,869

HIGH INTENSITY DISCHARGE LAMP CONTAINING IRON AND SILVER IN THE ARC TUBE FILLING

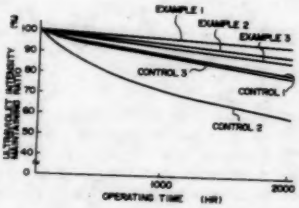
Akihiro Yonezawa, Yokosuka; Hiroki Sasaki, Yokohama; Yoichiro Mitsuyuki, Tokyo; Yasuki Mori, Yokohama, and Toshihiko Ishigami, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 10, 1988, Ser. No. 269,367

Claims priority, application Japan, Nov. 12, 1987, 62-284209; Sep. 6, 1988, 63-223006

Int. Cl.[5] H01J *61/20*

U.S. Cl. 313—639 **4 Claims**



1. A high intensity discharge lamp comprising:

a radiation transmitting arc tube;

a pair of electrodes tightly sealed in said arc tube for generating discharge therebetween; and

a filling within said arc tube, including rare gas, mercury, iron, a predetermined amount of halogen, and silver, the molar ratio of said silver iron being 0.05 to 0.2.

4,929,870

METHOD FOR THE TRANSMISSION OF CONTROL SIGNALS TO THE ROW DRIVE CIRCUITS IN THE CONTROL OF THIN-FILM ELECTROLUMINESCENT DISPLAYS

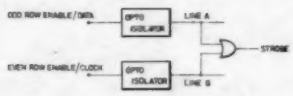
Terho Harju, Juhonkatu 1 D 27, 08200 Lohja 20, Finland

Continuation of Ser. No. 739,199, May 30, 1985, abandoned. This application Jun. 8, 1988, Ser. No. 206,899

Claims priority, application Finland, Jun. 5, 1984, 842257

Int. Cl.[5] H01Q *19/14;* **G09G** *3/30*

U.S. Cl. 315—169.3 **7 Claims**



1. A method for transmission of pulses of control signals to row drive circuits for control of thin-film electroluminescent displays, wherein the control signals include a data signal, a clock signal for clocking the data signal, a strobe signal that activates all input stages of the row drive circuits simultaneously, and two signals by means of which the drive circuits controlling odd rows and even rows are respectively chosen to be activated (odd row enable and even row enable), comprising steps of:

transmitting all of the control signals, with the exception of said strobe signal, via one first line and one second line,

providing a timing of the pulses on the first line and on the second line so that the signal of the first line is a combination of both the odd (or even) row enable and the data signal, and the signal of the second line is a combination of both the even (or odd) row enable and the clock signal, and

forming the strobe signal, by means of one logic gate, from the signals of the first line and of the second line, wherein the strobe signal is provided on a third line which is connected to an output of the gate.

4,929,871

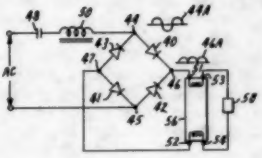
TRANSFORMERLESS CURRENT-LIMITING CIRCUIT

Sten R. Gerfast, 1802 Valley Curve Rd., Mendota Heights, Minn. 55118

Continuation-in-part of Ser. No. 874,539, Jun. 16, 1986, abandoned. This application Sep. 28, 1987, Ser. No. 101,764

Int. Cl.[5] H05B *39/09, 41/16*

U.S. Cl. 315—205 **17 Claims**



17. An appliance including (a) a fluorescent lamp having two cathode leads at each end and (b) a transformerless current-limiting circuit comprising:

(1) a 4-rectifier bridge circuit having a pair of AC inputs and two pairs of DC outputs,

(2) a pair of single-phase or two-phase AC terminals,

(3) means for connecting two cathode leads at opposite ends of the fluorescent lamp across one pair of the DC outputs and for connecting the other two cathode leads across the other pair of DC outputs, and

(4) a current-limiting capacitor and an inductive coil connected in series between one of the AC inputs and one of the AC terminals and providing the sole connection therebetween, the other of the AC inputs and AC terminals being directly interconnected.

4,929,872

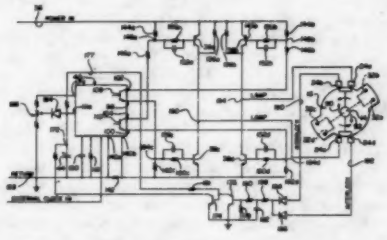
LIGHT BULB SOCKET SOFT START AND POWER INTERRUPT ASSEMBLY

Mark E. Bridges, Spencerport, and Robert W. Easterly, Churchville, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 11, 1988, Ser. No. 142,629

Int. Cl.[5] H05B *37/02, 39/04*

U.S. Cl. 315—209 R **20 Claims**



19. Apparatus comprising:

an assembly for mounting a light bulb, said mounting assembly including a wall having first and second oppositely facing surfaces and an opening therethrough, with first and second pairs of contacts located on said first surface of said wall radially outward from said opening; and including a socket member having first and second radially extending wings with first and second contacts respectively supported in radially extending positions spaced out from said wings; said socket member being movable relative to said wall between an engaged position in which said first and second contacts are brought through said opening from the second surface side of said wall to establish electrical connection respectively with said first and second pairs of contacts, with said wings remaining on said second surface side to releasably lock said socket member to said wall, and a disengaged position in which said established electrical connection is broken and said socket member is separated from said wall;

first switching means, including a capacitor, connected to one contact of each of said pairs of contacts for controlling supply of electrical power from a source to said one contacts in accordance with charging of said capacitor; and

second switching means connected to said other contact of each of said pairs of contacts, said second switching means being responsive to movement of said socket member from said disengaged to said engaged position for causing the charging of said capacitor for activating said first switching means to supply said electrical power to said one contacts to light said bulb, and being responsive to movement of said socket member from said engaged to said disengaged position for causing the discharging of said capacitor for deactivating said first switching means to remove said electrical power from said one contacts.

4,929,873

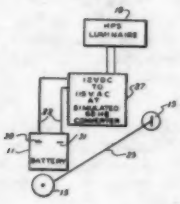
LUMINAIRE SYSTEM

Steven E. Summer, Setauket, N.Y., assignor to Powr-Ups Corporation, Bohemia, N.Y.

Filed Jun. 6, 1988, Ser. No. 203,977

Int. Cl.[5] H05B *37/02*

U.S. Cl. 315—219 **4 Claims**



1. A high pressure sodium lamp lighting system having portable characteristics, said system including

(a) a portable power supply providing at least 12 volts direct current;

(b) means for converting said portable power supply into an alternating current power supply providing a voltage level of at least 115 volts, said alternating current characterized by a symmetrical quasi-square wave with 60 degrees of zero voltage and 120 degrees of full voltage per half cyle;

(c) mean for applying said alternating current power supply to a starting circuit said starting circuit connected to a high pressure sodium lamp including an envelope containing gas and two spaced apart terminals, said gas adapted to be ionized by high voltage pulses applied to at least one terminal of said two spaced apart terminals; and,

(d) means for applying said symmetrical quasi-square wave supply across said two spaced apart terminals of said high pressure sodium lamp for maintaining said lamp in an ionized state after said gas is ionized by said high voltage pulses.

4,929,874

VIBRATION CONTROL SYSTEM

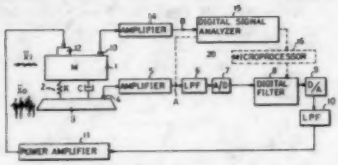
Keiichiro Mizuno, Tokyo; Kazuyoshi Iida, and Kazutomo Murakami, both of Yokohama, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed Sep. 22, 1988, Ser. No. 247,562

Claims priority, application Japan, Sep. 25, 1987, 62-241479

Int. Cl.[5] F16M *13/00;* **B64C** *17/06*

U.S. Cl. 318—128 **5 Claims**



1. A vibration control system for isolating or damping vibration of a body to be protected from the vibration, said body being supported on a movable foundation through the medium of a vibration isolating supporting structure, comprising:

a vibration sensor for detecting vibration of said movable foundation;

an inverse vibration signal generating device supplied with the detection signal output from said vibration sensor for generating a vibration signal of such a waveform as to cancel out the vibration of said body through interference therewith; and

an actuator connected operatively to said body and said inverse vibration signal generating device for converting said vibration signal derived from said inverse vibration signal generating device into a mechanical vibration to be applied to said body to thereby decrease the vibration thereof.

4,929,875

METHOD TO CONTROL STOPS OF AN INTERMITTENTLY OPERATING DRIVING MOTOR

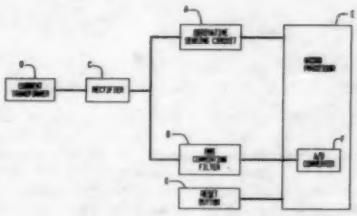
Staffan Olsson, Stockholm, Sweden, assignor to Flyct AB, Solna, Sweden

Continuation-in-part of Ser. No. 316,276, Feb. 27, 1989. This application Jun. 28, 1989, Ser. No. 372,988

Claims priority, application Sweden, Mar. 4, 1988, 8800772

Int. Cl.[5] H02P *3/18*

U.S. Cl. 318—362 **2 Claims**



1. A method to control stopping of an electric motor for a pump, the stopping being dependent upon the current consumption of the motor, comprising the steps of:

coupling a current signal from one phase of said motor to a transformer, and connecting said current signal from the output of the transformer to a rectifier;

rectifying said current signal and coupling said rectified signal to a derivative sensing circuit and an RMS converting filter circuit;

generating a derivative signal representing an actual current consumption value in said derivating sensing circuit and coupling said derivative signal to a microprocessor;

producing a mean current value in said RMS circuit and coupling said mean current value to said microprocessor, said microprocessor having previous predetermined stored mean values;

comparing in said microprocessor the actual current consumption value with a stored mean value of the nearest previous predetermined stored mean values; and

stopping the motor when a predetermined difference is detected between the actual current consumption value and the stored mean value of the nearest previous predetermined stored mean values.

4,929,876

ELECTRIC WINDSHIELD WIPING APPARATUS

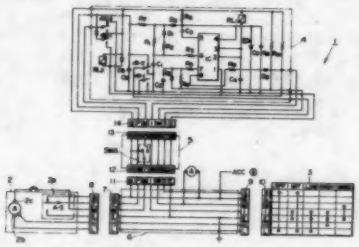
Masaru Kato, Hiratsuka, Japan, assignor to Jidosha Denki Kogyo Kabushiki Kaisha, Kanagawa, Japan

Continuation-in-part of Ser. No. 26,921, Mar. 17, 1987, abandoned. This application Aug. 12, 1988, Ser. No. 233,986

Claims priority, application Japan, Apr. 14, 1986, 61-56322[U]

Int. Cl.[5] B60S *1/08*

U.S. Cl. 318—444 **3 Claims**



1. An electric windsheld wiping apparatus, comprising:

a wiper switch for changing between a plurality of wiper modes;

a wiper motor for rotating forwardly and reversely;

a link connector mechanism connected to the wiper motor;

a wiper blade connected to said link connector mechanism and reciprocally moving between an upper turning position and a lower turning position on a wiped surface of a window;

a wiper control mechanism provided with an intermittent amplifier for the reciprocal movement of the wiper blade;

a wiring harness connecting said wiper switch and said wiper motor;

concealing means for moving the wiper blade downward from the lower turning position by a reverse rotation of the wiper motor and stopping said wiper blade at a given housing position; and

a unit arranged detachably using a connector between said intermittent amplifier and said wiring harness and having a change-over switch therein for electrically controlling the actuation of the reverse rotation of the wiper motor.

4,929,877

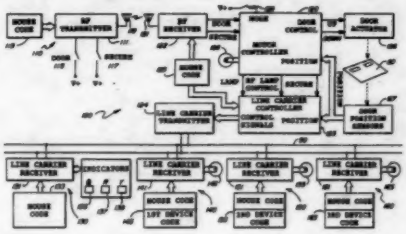
AUTOMATIC GARAGE DOOR OPERATOR WITH REMOTE LOAD CONTROL

John Clark, 2427 Shannondale Rd., Ann Arbor, Mich. 48104; Brian J. Martel, 1560 Robell, Walled Lake, Mich. 48088, and James S. Murray, 14403 Dixie, Redford, Mich. 48239

Division of Ser. No. 111,408, Oct. 22, 1987, Pat. No. 4,847,542. This application May 23, 1989, Ser. No. 356,010

Int. Cl.[5] E05F *15/10*

U.S. Cl. 318—560 **10 Claims**



1. An automatic garage door operator for controlling a remote load and the position of a garage door comprising:

a radio frequency receiver for generating a door signal upon receipt of a first encoded radio frequency signal and a secure signal upon receipt of a second encoded radio frequency signal;

a door actuator connected to the garage door for operating the garage door; and

a controller means connected to said radio frequency receiver, said door actuator and the remote load, said controller means having a secure mode, a non-secure mode, a load on mode and a load off mode for

controlling said door actuator to operate the garage door upon receipt of said door signal when said controller means is in said non-secure ode,

inhibiting said door actuator to prevent operation of the garage door upon receipt of said door signal when said controller means is in said secure mode,

toggling between said secure mode and said non-secure mode upon receipt of said secure signal when the garage door is closed,

turning the remote load ON upon receipt of said secure signal when the garage door is not closed and said controller means is in said load off mode, and

turning the remote load OFF upon receipt of said secure signal when the garage door is not closed and said controller means is in said load on mode.

4,929,878

MEMORY MIRROR CONTROL SYSTEM FOR VEHICLES AND THE LIKE

Randall F. Hansen, Dearborn, Mich., assignor to United Technologies Automotive, Inc., Dearborn, Mich.

Filed Jun. 27, 1989, Ser. No. 372,500

Int. Cl.[5] G05B *19/19*; G02B *7/18*

U.S. Cl. 318—560 **18 Claims**

1. In an electrically powered mirror control system, including

an electrically powered mirror of the "memory" type having at least two position motors driving it about two axes, a first axis (a) and a second axis (b), with each motor having an "on"/"off" switch associated therewith; and

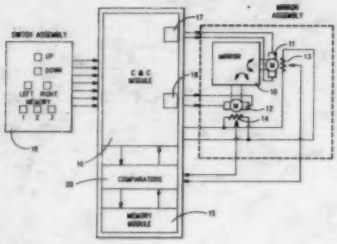
a memory module, in which at least one selected "memory" position (a_F, b_F) for the mirror with respect to the axes is encoded;

the improvement comprising:

mirror position sensor elements which produce electrical

signals indicative of the position (a_X, b_Y) of the mirror with respect to the two axes at a particular point in time;

a computational and control module associated with said sensor elements, the memory module, the motors and the switches, and having comparators for comparing an initial position (a_I, b_I) of the mirror determined by said sensor elements with the "memory" position of the mirror and determining the relative direction of the "memory" position from the initial position, from the relative values of the positions with respect to the axes, and cyclically monitoring the sensed current position of the mirror from the signals from said sensor elements, and generating signals



turning both of the motors "on" through the switches in the directions which moves the mirror toward the "memory" position (a_F, b_F), monitoring the changing position (a_X, b_Y) of the mirror with respect to the axes by the comparators comparing the changing mirror position (a_X, b_Y) to the "memory" position (a_F, b_F), and maintaining both of the motors "on" until at least one of the relationships $a_X = a_F$ and $b_Y = b_F$ is satisfied;

turning "off" the motor which moves the mirror about the axis for which the relationship is satisfied; and

turning "off" the other motor when the other relationship is satisfied;

moving the mirror from its initial position (a_I, b_I) toward the "memory" position (a_F, b_F).

4,929,579

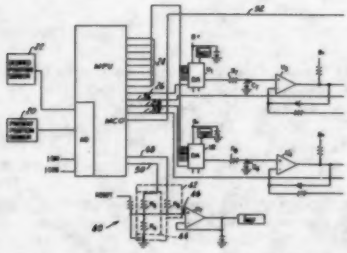
MICROSTEPPING OF AN UNIPOLAR STEPPING MOTOR

Danny O. Wright, Newport News, and Kregg S. Wiggins, Tabb, both of Va., assignors to Siemens-Bendix Automotive Electronics L.P., Troy, Mich.

Division of Ser. No. 158,015, Feb. 18, 1988, Pat. No. 4,855,668. This application Jun. 20, 1989, Ser. No. 369,445

Int. Cl.[5] H02P *8/00*

U.S. Cl. 318—696 **3 Claims**



1. A control system to control the amount of torque output of a stepper motor having windings, said system comprising:

means responsive to a control signal for generating at least one torque control signal representing a predetermined amount of motor current control;

means responsive to said one torque control signal for generating an analog signal having a sinusoidal waveshape at a frequency proportional to the rotational speed of the stepper motor;

means responsive to said sinusoidal waveshape signal for providing an amplitude value to said sinusoidal waveshape; and

means responsive to said amplitude sinusoidal waveshape and operable for switching the power to selected ones of the windings of the motor for causing the motor to rotate at a desired value of torque as controlled by said at least one torque control signal.

4,929,880

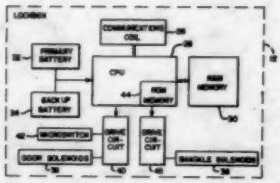
ELECTRONIC LOCK SYSTEM WITH BATTERY CONSERVATION FEATURES

Walter G. Henderson; George A. Ellson, both of Salem, and Edgar J. Unrein, Newberg, all of Oreg., assignors to Supra Products, Inc., Salem, Oreg.

Continuation-in-part of Ser. No. 192,833, May 11, 1988, abandoned, which is a continuation-in-part of Ser. No. 15,864, Feb. 17, 1987, Pat. No. 4,766,746, which is a continuation-in-part of Ser. No. 831,601, Feb. 21, 1986, Pat. No. 4,727,368, which is a continuation-in-part of Ser. No. 814,364, Dec. 30, 1985, abandoned, which is a continuation-in-part of Ser. No. 788,072, Oct. 16, 1985, abandoned. This application Dec. 27, 1988, Ser. No. 290,988

Int. Cl.[5] H02J *7/00*

U.S. Cl. 320—30 **14 Claims**



1. In an electronic lock system that includes a battery powered lock, an improvement comprising:

battery monitoring means for monitoring the status of the battery;

means for permitting usual operation of the lock if the battery monitoring means indicates that the battery is in a first state;

means for permitting usual operation of the lock and for indicating a low battery condition if the battery monitoring means indicates that the battery is in a second state corresponding to a battery energy lower than the first state; and

means for curtailing usual operation of the lock and for thereafter permitting operation of the lock only by a specially authorized key if the battery monitoring means indicates that the battery is in a third state corresponding to a battery energy lower than the second state.

4,929,881

PROBE FOR NUCLEAR MAGNETIC RESONANCE APPARATUS

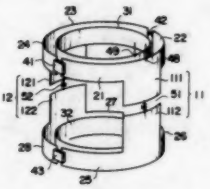
Masao Yabusaki, Tokyo; Etsuji Yamamoto, Akishima; Hiroyuki Takeuchi, Kashiwa, and Hideki Kohno, Tama, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Medical Corporation, Tokyo, both of, Japan

Filed May 25, 1989, Ser. No. 356,423

Claims priority, application Japan, May 27, 1988, 63-128359

Int. Cl.[5] G01R *33/20*

U.S. Cl. 324—318 **8 Claims**



1. A probe for a nuclear magnetic resonance apparatus comprising:

are arranged at a plurality of

arms which positions along an almost cylindrical surface and form a current path;

a plurality of wings made of conductor plates which are respectively extended to the right and left from upper and lower edges of said arms along said cylindrical surface and in which front edges of each of said plurality of wings are capacitively coupled with front edges of the wing adjacent to said wing; and

first and second guard rings made of ring-shaped conductor plates which are respectively provided at upper and lower edge positions of said arms and are respectively capacitively coupled with said wings,

wherein each of the arms comprises two conductor plates divided into upper and lower portions and an inductor connecting said two conductor plates.

4,929,882

APPARATUS FOR CONVERTING DC TO DC HAVING NON-FEED BACK VARIABLE HYSTERETIC CURRENT-MODE CONTROL FOR MAINTAINING APPROXIMATELY CONSTANT FREQUENCY

Tamas S. Szepesi, San Jose, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Jun. 23, 1987, Ser. No. 65,584

Int. Cl.[5] H02M *3/156*

U.S. Cl. 323—222 **4 Claims**

3. An hysteretic current-mode controlled stable frequency DC to DC boost power stage converter having an input voltage and an output voltage comprising:

a. a power stage circuit having:

(1) an inductor having an inductor current for forming the output voltage;

(2) a capacitor coupled to said inductor;

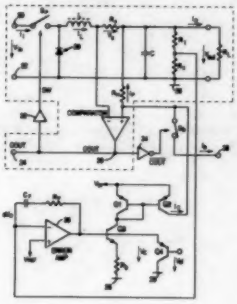
(3) a first control switch coupled to said inductor having an open position and a closed position;

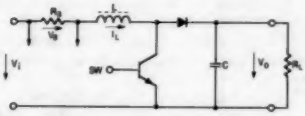
(4) means for oscillating said switch between said open position and said closed position thereby establishing a first duty cycle, said switch in said closed position coupling said input voltage to said power stage and said switch in said open position uncoupling said input voltage from said power stage; and

(5) feedback means for controlling a peak value of the inductor current wherein the feedback means controls an average inductor current with a control signal whereby the non-feedback means establishes the turn-on and said turn-off limits symmetrically around the control signal; and

b. non-feedback hysteretic control circuit for controlling said inductor current having a turn-on limit for closing said switch and a turn-off limit for opening the switch, said turn-on and turn-off limits being adjustable by said non-feedback control circuit to approximately maintain a constant frequency of oscillation wherein said control circuit establishes a duty cycle proportional control having;

(1) a controlled switch having a first pole and a second





pole, said controlled switch being controlled by a switching signal for switching said controlled switch between said first pole and said second pole, said first pole being coupled to a first voltage and said second pole coupled to a second voltage;

(2) a voltage filter and storage means coupled to a wiper of said controlled switch; and

(3) a driver means coupled to said filter and storage means for forming said control current.

4,929,883

CIRCUIT FOR SENSING THE TRANSISTOR CURRENT WAVEFORM

Davide Chieli, Milan, Italy, assignor to SGS-Thomson Microelectronics S.r.l., Agrate Brianza MI, Italy

Filed Sep. 13, 1989, Ser. No. 406,500

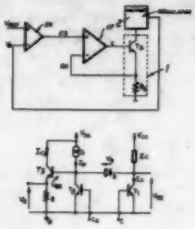
Claims priority, application Italy, Sep. 15, 1988, 21955 A/88

Int. Cl.[5] G05F *1/565*

U.S. Cl. 323—282 **9 Claims**

1. A circuit for sensing a transistor current waveform, including a switching transistor having collector and emitter terminals connected between a first and a second reference potential line, and a base terminal receiving a switching signal, and a transducing differential amplifier circuit connected at the input to said collector and emitter terminals of said switching transistor and generating at the output a transduced voltage proportional to the emitter to collector voltage of said switching transistor, said transduced voltage being fed to a sensing

resistor arranged between the output of said transducing differential amplifier circuit and said second reference potential line



and generating a sensing current proportional to the collector current of said switching transistor.

4,929,884

HIGH VOLTAGE SEMICONDUCTOR WITH INTEGRATED LOW VOLTAGE CIRCUITRY

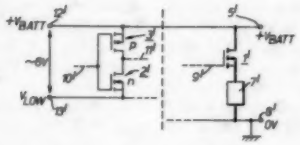
Philip H. Bird, Sidcup, England; David J. Coe, East Grinstead, Great Britain; David H. Paxman, Redhill, England, and Aart G. Korteling, Waalre, Netherlands, assignors to U.S. Philips Corp., New York, N.Y.

Filed Jun. 6, 1988, Ser. No. 203,407

Claims priority, application United Kingdom, Jun. 8, 1987, 8713385

Int. Cl.[5] G05F *3/16*

U.S. Cl. 323—313 12 Claims



1. A power switching circuit suitable for controlling a load in an electrical system having a positive, high-voltage supply terminal and a negative common return terminal, the circuit being connected in operation between the high-voltage supply terminal and one terminal of the load, another terminal of the load being connected to the return terminal, the circuit comprising an electrically conductive semiconductor substrate carrying a high-voltage semiconductor output device in which conduction is predominantly by electrons, the substrate comprising a region of the output device for connection to the high-voltage supply terminal, the substrate also carrying at least one low-voltage semiconductor device forming part of a low-voltage circuit connected in operation to two low-voltage supply terminals, characterized in that the circuit further comprises means for eliminating the need for high-voltage isolation between the low-voltage device and the semiconductor substrate by maintaining each of the two low-voltage supply terminals at no more than a low and substantially constant voltage with respect to the positive high-voltage supply terminal.

4,929,885

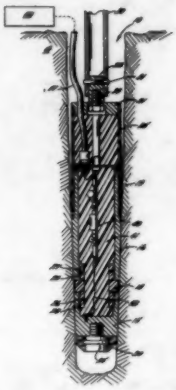
APPARATUS FOR MEASURING GROUND MOISTURE CONTENT OF SOIL

Michael R. Dishman, Raleigh, N.C., assignor to Troxler Electronic Laboratories, Inc., Research Triangle Park, N.C.

Filed Nov. 8, 1988, Ser. No. 268,935

Int. Cl.[5] G01R *27/26*

U.S. Cl. 324—664 6 Claims



1. A capacitance moisture sensor probe for sensing the ground moisture content of soil, the moisture sensor probe having a generally cylindrical body with first and second opposite ends, the generally cylindrical body comprising:

a first substantially rigid structural component having a tapered outer surface portion defining a first electrically conductive capacitance sensing electrode;

a second substantially rigid structural component having a tapered outer surface portion defining a second electrically conductive capacitance sensing electrode;

a dielectric spacer securely attached to each of said first and second components such that said components are dielectrically and longitudinally spaced apart at opposite ends of said spacer so that the moisture sensor probe senses the capacitance of soil in the proximity of the first and second electrodes and wherein said dielectric spacer includes threaded opposite end portions, and each said first and second structural components have threaded end portions cooperating with said threaded end portions of said dielectric spacer to secure the first and second structural components to the dielectric spacer; and

wherein one of said components has an internal cavity and said body includes an electronic circuit located within said internal cavity and electrically connected to each of said first and second electrodes, and said internal cavity further including a dielectric filler surrounding the electronic circuit and filling said internal cavity to prevent water from permeating the internal cavity and harming the electronic circuit.

4,929,886

APPARATUS FOR DETECTING NOISE IN THE MEASUREMENT OF VERY SMALL RESISTANCE

Nakaie Toshiyuki, Wakayama, Japan, assignor to Hanwa Electronic Co., Ltd., Wakayama, Japan

Filed Jul. 26, 1989, Ser. No. 386,364

Int. Cl.[5] G01R *27/00*

U.S. Cl. 324—691 2 Claims

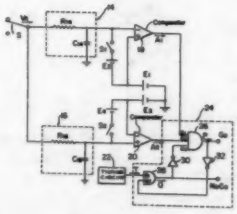
1. In an ohmmeter which includes a phase detection means to split each cycle of a voltage signal to be measured into a first and second series of half waves, an inverter means to inverse

the second series of half waves, an integrating R-C circuit means to combine the first and second series of half waves in such a manner as to achieved a reduction in the noise component of the superimposition of noise and a signal to be measured, the improvement comprising:

the integrating R-C circuit means comprising a pair of first R-C integrating circuit and second R-C integrating circuit connected in parallel:

a first switch means S_1 adapted to charge a first capacitor in the first R-C integrating circuit with a first combined voltage E_1+E_3 of a first positive threshold voltage E_1 with positive initial set up voltage E_3;

a second switch means S_2 adapted to charge a second capacitor in the second R-C integrating circuit with a second combined voltage E_2-E_4 of a second positive threshold voltage E_2 with negative initial set up voltage $-E_4$, the first threshold voltage E_1 and second threshold voltage E_2 being set to differ in magnitude from each other so as to define a threshold voltage range, the first switch means S_1 and second switch means S_2 being actuated to close a supply circuit which in turn supplies both the first com-



bined voltage E_1+E_3 to the first capacitor, and the second combined voltage E_2-E_4 to the second capacitor, respectively, a predetermined time before the entrance of a voltage signal to be measured, the first and second switch means being opened to break the supply circuit upon the input of the voltage signal to be measured;

a first comparator connected to the first R-C integrating circuit and adapted to compare the first threshold voltage and a first output voltage discharged from the first capacitor;

a second comparator connected to the second R-C integrating circuit and adapted to compare the second threshold voltage and a second output voltage discharged from the second capacitor;

a logic circuit connected to the first and second comparators and a timing circuit, the timing circuit adapted to supply timing signals to the logic circuit, the logic circuit adapted to determine whether the first and second discharged voltages are within the range of their associated threshold voltages E_1 and E_2 in a set time following the input of the voltage signal to be measured in conjunction with the timing signal from the timing circuit.

4,929,887

ELECTRICAL OUTLET MONITOR

James M. Robitaille, Maple Heights, Ohio, and Robert W. Wilson, Austin, Tex., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jan. 19, 1989, Ser. No. 300,091

Int. Cl.[5] G01R *31/04, 31/02*

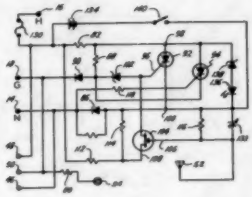
U.S. Cl. 324—66 **16 Claims**

5. An apparatus for monitoring an electrical power supply having hot, neutral and ground spades, comprising:

indicator means having at least two states, a first state corresponding to a properly wired power supply, and a second state corresponding to an improperly wired power supply, said indicator means being energized in said first state;

prong means for electrically connecting said indicator means to the electrical power supply, including hot, neutral and ground prongs for mating with the hot, neutral and ground spades of the power supply;

shunting means for preventing electrical current from energizing said indicator means when the electrical power



supply is miswired, said shunting means being connected in parallel to said indicator means, said shunting means including first and second silicon controlled rectifiers each connected in parallel with said indicator means; and

means for housing said indicator means, prong means, and shunting means.

4,929,888

PIN ELECTRONICS DEVICE HAVING A PHASE ADJUSTMENT FUNCTION FOR IC TESTERS AND PHASE ADJUSTMENT METHOD THEREFOR

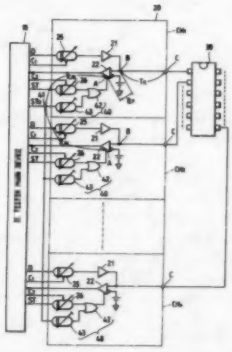
Kenji Yoshida, Gyoda, Japan, assignor to Advantest Corporation, Tokyo, Japan

Filed Aug. 23, 1989, Ser. No. 397,884

Claims priority, application Japan, Aug. 29, 1988, 63-215855

Int. Cl.[5] G01R *15/12, 31/02*

U.S. Cl. 371—25.1 **7 Claims**



1. A pin electronics device comprising:

a driver provided for each of a plurality of channels, for supplying a drive signal to the corresponding terminal of an IC under test;

a logical comparator means provided in said each channel, which has an input connected to the output of said driver, receives a response signal from said corresponding terminal of said IC under test, and determines the logic of its level;

a first variable delay means provided in said each channel, for adjusting the phase of said drive signal which is output from said driver in said each channel;

a second variable delay means inserted in a path for applying therethrough a reference strobe signal from a common

reference strobe output terminal to a strobe terminal of said logical comparator means of said each channel, for adjusting the phase of said reference strobe signal; and

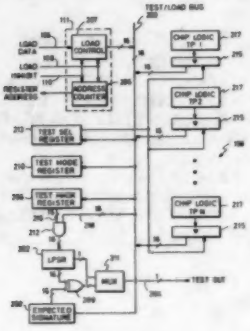
a third variable delay means provided in said each channel, for adjusting the phase of a strobe pulse which is applied to said strobe terminal of said logical comparator means.

4,929,889

DATA PATH CHIP TEST ARCHITECTURE

Larry D. Seller, Boylston; James L. Pappas, Leominster, and Robert C. Rose, Hudson, all of Mass., assignors to Digital Equipment Corporation

Filed Jun. 13, 1988, Ser. No. 206,194
Int. Cl.[5] G01R *31/26*
U.S. Cl. 371—22.3 **12 Claims**



1. In a clocked integrated circuit implemented on a semiconductor chip, and having a control register, a multiple input linear feedback shift register, a plurality of test points located at predetermined nodes in said circuit, a plurality of memory registers, and further having a common load/test circuit implemented on the semiconductor chip, a method of testing the integrated circuit using the common load/test circuit to provide a resultant test signature indicative of the values at said nodes, comprising the steps of:

a. specifying in the control register the set of test points to be tested;

b. loading test data into at least one of the memory registers by way of the common load/test circuit;

c. commencing testing of the test points during a test period, the test period having defined subperiods in which the test is not performed, the test period defined by several of the integrated circuit clock cycles;

d. sampling the set of test points during each clock cycle to provide a set of test data;

e. entering said test data into the multiple input linear feedback shift register; and

f. at the conclusion of the test period, shifting the resulting test data out of the shift register thereby to provide said signature;

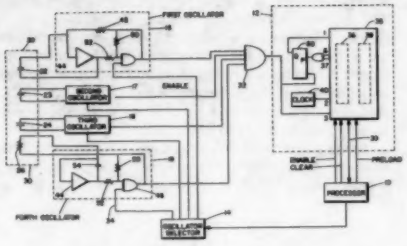
wherein the semiconductor chip comprises a data path logic unit in a video graphics system and wherein the testing of step is performed during video monitor refresh and wherein the step of shifting the resulting test data of step is performed during video monitor vertical retrace.

4,929,890

SYSTEM FOR OBTAINING DIGITAL OUTPUTS FROM MULTIPLE TRANSDUCERS

Robert L. Bell, Agoura Hills, and Herman L. Renger, Calabasa, both of Calif., assignors to Bell Microsensors, Inc.

Division of Ser. No. 895,904, Aug. 11, 1986, Pat. No. 4,732,043.
This application Nov. 6, 1987, Ser. No. 118,294
Int. Cl.[5] G01R *23/02*
U.S. Cl. 324—78 R **5 Claims**



1. Apparatus for determining the frequency of an oscillator, comprising:

means for generating enabling commands including means for receiving count data;

first counter means responsive to the enabling command for counting a preselected number of oscillations of the oscillator, and said first counter means can be preset to a given value such that the resolution of the reading of the frequency can be varied and producing an indication when the preselected number of oscillations have occured;

high frequency clock means having a frequency higher than the oscillator; and

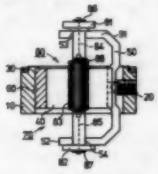
second counter means coupled to the means for generating commands and responseive to signals from the clock means and the indication produced by the first counter means for counting signals from the clock source which occur subsequent to the command and prior to the indication, and wherein the means for generating commands presets the second counter means and is responseive to both overflows and the final count from the second counter means, such that the second counter means can provide a higher resolution count than its nominal capacity.

4,929,891

EXCITING UNIT FOR INTERNAL MAGNET TYPE METERS

Akira Yoneda, and Katsuyoshi Miura, both of Tokyo, Japan, assignors to Yokogawa Electric Corporation, Tokyo, Japan

Continuation of Ser. No. 74,366, Jul. 16, 1987, abandoned. This application Jan. 13, 1989, Ser. No. 298,218
Claims priority, application Japan, Aug. 7, 1986, 61-185528
Int. Cl.[5] G01R *1/16*
U.S. Cl. 324—154 PB **2 Claims**



1. In an exciting unit for use with an internal magnet type meter, comprising a cylindrical permanent magnet of a first

axial dimension, said permanent magnet having pole shoes of a dimension substantially equal to said first axial dimension, and a cylindrical yoke incorporating said permanent magnet through an air gap arranged to make rotatable effective sides of a movable coil, the improvement comprising

a generally rectangular column-like spacer formed of a non-magnetic material and having a radial thickness corresponding to said air gap of an dimensional substantially equal to said first axial dimension, one side of said spacer being secured to a peripheral surface of said permanent magnet, and an opposite site of said spacer being formed with two chamferred angular portions;

a holding frame formed of a long, flat and tubular non-magnetic material, both ends of which are shaped by folding to be crooked at right angles in the same direction, said frame comprising an arm member to which said movable coil is attached and a stem formed with a hole or recess, said stem being fitted to said peripheral surface of said permanent magnet on the opposite side of said spacer, said holding frame being disposed inwardly of said cylindrical yoke;

a flange secured to said yoke and formed with a mounting hole for mounting said exciting unit on a base;

a single screw hole formed in said cylindrical yoke; and

a single mounting screw fitted into said single screw hole of said cylindrical yoke and having a tip thereof engaging said hole or recess of said stem of said holding frame so as to mount in said cylindrical yoke said permanent magnet secured to said holding frame through said spacer;

wherein by rotating said single mounting screw only said chamferred portions of said spacer are thrust against an inner surface of said cylindrical yoke so that said cylindrical permanent magnet is mounted in said cylindrical yoke and accurately positioned in the axial and peripheral directions and locked in position by use of only said single mounting screw engaged in said hole or recess of said stem of said holding frame and without requiring the circular shape of said cylindrical permanent magnet to be altered, or the cylindrical yoke to have any other positioning hole.

4,929,892

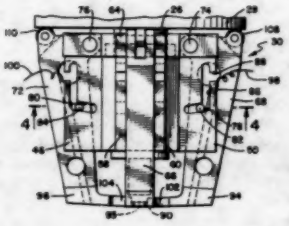
PROCESS FOR ELECTRICALLY TESTING A COMPONENT IN TRANSIT TO ASSEMBLY AND COMPONENT TEST CHUCK

Alan B. Larsen, Provo, Utah, assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Feb. 9, 1989, Ser. No. 309,463

Int. Cl.[5] G01R *31/02, 1/06*

U.S. Cl. 324—158 F **12 Claims**



1. A component test chuck for use on a transfer arm comprising:

a holder, said holder having first, second, third and fourth pairs of flanges extending therefrom;

at least four pivot openings on said holder, first, second, third and fourth pivot pins respectively in said pivot openings in said holder, said first and second pivot pins being opposite each other and on substantially parallel axes, and said third and fourth pivot pins being opposite each other and on substantially parallel axes to each other and at substantially right angles to the axes of said first and second pivot pins;

first and second arms mounted between said first and second pairs of flanges on said first and second pivot pins, said third and fourth arms respectively pivotally mounted between said third and fourth pairs of flanges on said third and fourth pivot pins;

a collar, cam follower means on each of said first, second, third and fourth arms for being engaged by said collar for thrusting said arms in a direction to rotate said arms on said pivot pins to close said fingers toward each other;

first and second fingers respectively mounted on said first and second arms and third and fourth fingers respectively mounted on said third and fourth arms, said fingers being sized to grasp an electrical component when said arms are pivoted on said pivot pins in a direction to move said fingers toward each other, said first and second fingers being dielectric and said third and fourth fingers being electrically conductive so that a component grasped between said third and fourth fingers can be electrically tested.

4,929,893

WAFER PROBER

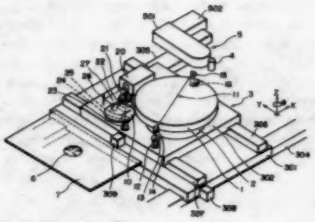
Mitsuya Sato; Takao Ukaji; Nobuhito Yamaguchi; Taro Ohmori, and Eiichi Murakami, all of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 4, 1988, Ser. No. 252,997

Claims priority, application Japan, Oct. 6, 1987, 62-252822; Oct. 31, 1987, 62-276341

Int. Cl.[5] G01R *31/02, 1/06;* **G06K** *9/00*

U.S. Cl. 324—158 F **14 Claims**



1. A wafer prober, comprising:

a wafer chuck for holding a wafer;

an X-Y stage for moving said wafer chuck in X and Y directions;

a contact plate;

a driving mechanism for moving said contact plate in a Z direction relatively to said X-Y stage;

detecting means for detecting information which can be used to press contact said contact plate against at least one of tips of probe needles of a probe card with use of said X-Y stage and said driving mechanism;

image pickup means for observing said at least one needle tip press contacted to said contact plate, from a side of said contact plate opposite to the side thereof engaged by said at least one needle tip; and

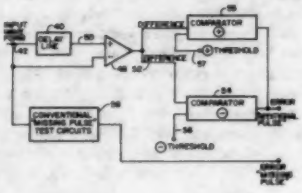
processing means for processing a signal from said image pickup means to obtain information to be used for alignment of the probe needles with the wafer.

4,929,894

METHOD AND APPARATUS FOR INCREASING THROUGHPUT ON DISK DRIVE QUALITY CONTROL TESTING

Michael R. Monett, Santa Clara, Calif., assignor to Memory Technology, Boulder, Colo.

Filed Aug. 23, 1988, Ser. No. 235,404
Int. Cl.[5] G01R *33/12;* **G11B** *27/36*
U.S. Cl. 324—212 **5 Claims**



1. An apparatus for increasing throughput for disk drive quality control testing comprises of "missing pulse" and "extra pulse" tests comprising:

means for writing test data on the tracks to be tested of a disk drive;

means for reading said test data and for simultaneously performing said "missing pulse" and "extra pulse" tests; and

wherein said means for reading comprises:

delay means for receiving a periodic input signal indicative of the magnetic transitions embodying said test data and for delaying said input signal by an interval equal to one period of said input signal;

difference means coupled to receive said delayed input signal and to receive an undelayed version of said input signal, for subtracting the delayed input signal from said undelayed input signal to determine the difference between the amplitudes of these two signals and for generating a signal indicative of said difference;

comparator means having an input for receiving a reference signal representative of a test threshold used in said "extra pulse" test and coupled to receive the output of said difference means, for comparing said difference signal to said threshold and for generating an error signal indicating when said difference signal exceeds said threshold, said error signal indicating the location of a probable defect on the track under test.

4,929,895

THICKNESS GAUGE FOR MOVING SHEET MATERIAL WITH INNER AND OUTER FLEXIBLY MOUNTED BEARINGS

Pekka M. Typpo, Cupertino, Calif., assignor to Impact Systems, Inc., San Jose, Calif.

Filed Mar. 22, 1989, Ser. No. 326,906
Int. Cl.[5] G01B *7/10;* **D21F** *7/06;* **G01R** *33/12*
U.S. Cl. 324—231 **8 Claims**

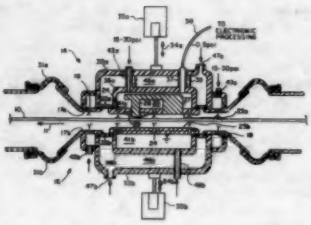
1. A thickness gauge for moving sheet material comprising:

first and second magnetic circuit means juxtaposed on opposite sides of said sheet indicative of the thickness of said sheet; upper and lower means on opposite sides of said sheet for respectively flexibly carrying said first and second magnetic circuit means, each of said upper and lower means including:

outer bearing means including an outer rigid ring with a plurality of spaced air exit means around the circumference of such outer ring for providing an air bearing between said ring and said sheet;

means for flexibly causing said outer ring to move toward engagement with said sheet, said opposed outer rings of said upper and lower means tending to flatten a portion of said sheet encompassed by said rings;

rigid inner disk-like bearing means respectively carrying said first and second magnetic circuit means;



means for flexibly connecting said inner disk-like bearing means to said rigid ring of said outer bearing means to place them in substantially the same plane;

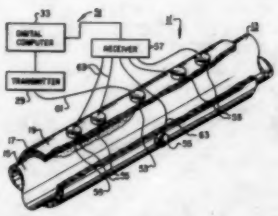
and means for flexibly causing said inner bearing means to move said magnetic circuit means toward engagement with said sheet.

4,929,896

TRANSIENT ELECTROMAGNETIC METHOD FOR DETECTING IRREGULARIES ON CONDUCTIVE CONTAINERS HAVING VARIATIONS IN JACKET THICKNESS

Pedro F. Lara, Dallas, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Continuation of Ser. No. 292,563, Dec. 29, 1988, abandoned.
This application Nov. 21, 1989, Ser. No. 442,426
Int. Cl.[5] G01N *27/82;* **G01R** *33/12;* **G01B** *7/10*
U.S. Cl. 324—240 **29 Claims**



1. A method for detecting irregularities on electrically conductive walls of container means, comprising the steps of:

(a) providing transmitting antenna means and transmitter means connected with said transmitting antenna means;

(b) providing receiving antenna means and receiver means connected with said receiving antenna means;

(c) placing said transmitting antenna means in proximity to that portion of the container means wall which is to be investigated;

(d) placing said receiving antenna means in proximity to the container means wall portion and in proximity to said transmitting antenna means, said receiving antenna means being separated from said transmitting antenna means;

(e) providing an abruptly changing current to said transmitting antenna means from said transmitter means so as to induce current into the container means wall portion;

(f) detecting the presence of and the decay of said induced current in said container means wall portion with said receiving antenna means to produce a received signal, said received signal having an intermediate time range and a late time range, said received signal having a maximum

occurring in the intermediate or late time ranges, said received signal having an arrival time which is the time when said maximum occurs;

(g) examining said received signal to determine the maximum of said received signal and examining the received signal to determine the arrival time of said maximum, said maximum and said arrival time providing an indication of the presence or absence of irregularities in said container means wall portion, wherein the presence of irregularities is indicated by a maximum which is greater than a maximum obtained from an irregularity-free container means wall portion.

4,929,897

METHOD AND APPARATUS FOR DETECTING CROSS SECTIONAL AREA VARIATIONS IN A ELONGATE OBJECT BY MEASURING RADIAL MAGNETIC FLUX VARIATIONS USING SPACED-APART COILS

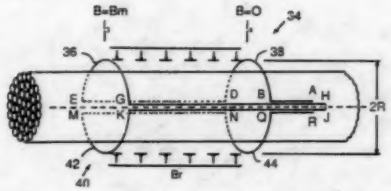
Nicholaas T. Van Der Walt, Kibler Heights, South Africa, assignor to Crucible Societe Anonyme

Filed Nov. 18, 1988, Ser. No. 273,268

Claims priority, application South Africa, Nov. 23, 1987, 87/8753

Int. Cl.[5] G01N *27/82, 27/72;* G01R *33/12*

U.S. Cl. 324—240 **9 Claims**



1. Apparatus for detecting cross-sectional variations in an elongate object which comprises a magnetizing head for establishing a first magnetic field and at least a second magnetic field which is adjacent the first magnetic field, means for forming a pathway which permits the elongate object to travel in an axial direction through the first magnetic field and through the second magnetic field so that the elongate object is magnetized in opposing axial directions by the first and second magnetic fields respectively, at least two saddle coils positioned opposite one another on opposing sides of the pathway, each saddle coil having at least first and second half circumferential windings which are positioned axially spaced from one another, the first half circumferential windings of the respective saddle coils being positioned at a location where the magnetic flux density in the object is at a maximum value and the second half circumferential windings being positioned at a location where the magnetic flux density in the object is zero, and means for detecting a voltage which is induced in the saddle coils.

4,929,898

TRANSIENT ELECTROMAGNETIC METHOD FOR DETECTING IRREGULARITIES ON CONDUCTIVE CONTAINERS

Brian R. Spies, McKinney, Tex., assignor to Atlantic Richfield, Los Angeles, Calif.

Continuation-in-part of Ser. No. 134,368, Dec. 17, 1987, Pat. No. 4,843,320. This application Dec. 29, 1988, Ser. No. 291,632

Int. Cl.[5] G01N *27/90;* G01R *33/12;* G01B *7/10*

U.S. Cl. 324—242 **24 Claims**

1. A method of detecting irregularities on electrically conductive walls of container means, comprising the steps of:

(a) providing transmitting antenna means and transmitter means connected with said transmitting antenna means;

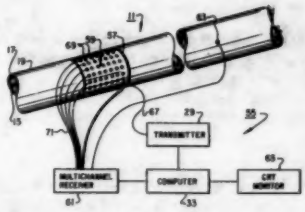
(b) providing receiving antenna means and receiver means, said receiving antenna means comprising many receiving antennas, said receiver means being connected with each of said receiving antennas;

(c) providing a two-dimensional display means for displaying the received signals;

(d) placing said transmitting antenna means in proximity to that portion of the container means wall which is to be investigated for irregularities;

(e) placing said receiving antenna means in proximity to that portion of the container means wall which is to be investigated for irregularities, said receiving antenna means being placed near said transmitting antenna means, said individual receiving antennas being distributed over said container means wall portion in a predetermined spatial relationship with one another;

(f) providing an abruptly changing current to said transmitting antenna means from said transmitter means so as to induce current into the investigated container means wall portion;



(g) detecting the presence of and the decay of said induced current in said investigated container means wall portion with said receiving antennas and said receiver means to produce many received signals, said many received signals being obtained simultaneously by said receiving antennas and said receiver means;

(h) dividing the received signals into samples of time, such that the respective samples of time of each received signal correspond to respective samples of time of the other received signals;

(i) creating a two-dimensional display on said display means for a sample of time by displaying the respective corresponding time sample of each of the received signals in a spatial arrangement on said display means that corresponds to the spatial arrangement of said receiving antennas on said container means wall portion, wherein for each sample of time there is a corresponding two-dimensional display.

4,929,899

FLUXGATE MAGNETOMETER APPARATUS AND ADJUSTMENT METHOD TO MAINTAIN ACCURACY OVER A WIDE TEMPERATURE RANGE

Lawrence M. Weixelman, and Richard D. Swanson, both of Wichita, Kans., assignors to Boeing Company

Filed Feb. 24, 1988, Ser. No. 159,751

Int. Cl.[5] G01R *33/04;* G01C *17/28*

U.S. Cl. 324—253 **15 Claims**

1. A fluxgate magnetometer for maintaining accuracy over a wide temperature range comprising

a high permeable magnetic core means of essentially constant magnetic path cross section;

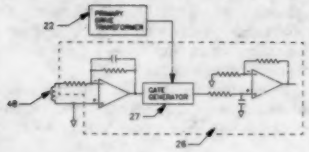
a primary winding means disposed on said core means for applying an alternating voltage to alternately saturate and unsaturate said core means with magnetic fields of opposite polarities;

a secondary winding means disposed on said core means and said primary winding means to form a fluxgate and being responsive to said alternate saturation and unsaturation of said core means inducing in said secondary winding means

a voltage pulse upon each transition from core saturation to unsaturation;

means for creating a saturation field strength of more than 20 times that required to drive said core means to flux saturation;

input means for supplying an alternating voltage to said primary winding means;



output circuit means for measuring and summing the voltage pulses induced in said secondary winding means; and

means for determining the magnitude or direction of said external magnetic field from said measured and summed voltage pulses for given orientations of said fluxgate.

4,929,900

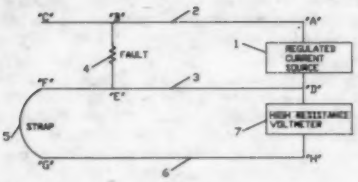
METHOD FOR LOCATING CONDUCTIVE FAULTS IN TELEPHONE AND SIMILAR CABLES

Mark W. Hastings, Weatherford, and James M. Buzbee, Mineral Wells, both of Tex., assignors to Industrial Technology, Inc., Mineral Wells, Tex.

Continuation of Ser. No. 138,939, Dec. 29, 1987, abandoned. This application May 19, 1989, Ser. No. 356,646

Int. Cl.[5] G01R *31/08*

U.S. Cl. 324—525 **4 Claims**



1. A method of locating a conductive fault in a telephone or similar shielded cable, comprising the steps of;

a. connecting a constant current source and establishing a known and constant current flow from the constant current source located at a reference point location through a first faulted conductor, an unknown fault resistance and a second faulted conductor and back to the constant current source;

b. connecting said second faulted conductor at a point beyond the fault to a non-faulted conductor which extends to the reference point location;

c. connecting a high resistance voltmeter and measuring the voltage between the second faulted conductor and the non-faulted conductor at the reference point location, with the resistance of said high resistance voltmeter being such that the current flow through it is negligible when compared with said constant current;

d. utilizing the magnitude of the known current flow in said second faulted conductor between said reference point location and the fault location and the magnitude of the voltage indicated by said high resistance voltmeter to determine the distance from said reference point location to the fault location.

4,929,901

DC GROUND FAULT DETECTION

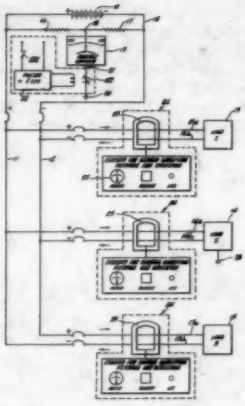
Dorr Kimball, 304 N. El Molino, Alhambra, Calif. 91801; Michael G. Cox, 19009 Laurel Park Rd., #299, Dominguez Hills, Calif. 90220, and Manuel R. Cabison, 717 E. Norwood, San Gabriel, Calif. 91776

Continuation of Ser. No. 182,996, Apr. 18, 1988, abandoned, which is a continuation-in-part of Ser. No. 773,333, Sep. 6, 1985, Pat. No. 4,739,274. This application Jul. 13, 1989, Ser. No. 380,728

The portion of the term of this patent subsequent to Apr. 19, 2005, has been disclaimed.

Int. Cl.[5] G01R *31/08, 31/02*

U.S. Cl. 324—529 **70 Claims**



15. Apparatus for the detection of low level ground leakage current in a normally ungrounded DC system in a multifeeder distribution system having a relatively high capacitive reactance and being associated with a relatively strong electromagnetic and electrostatic field, said system including a DC power supply, conductors from the supply for supplying power to a load connected in the DC system comprising a resistor element for connection across the DC power supply, a tapping point to the resistor element, a connector between the tapping point and a ground point such that a ground leakage current in the system completes a ground circuit, a relay between the tapping point and ground, a pulser for periodically opening and closing said relay while the ungrounded DC system remains substantially closed and operational, the opening and closing of said relay interrupting said ground circuit effectively thereby to generate a DC pulse interrupted ground fault signal and a magnetic sensor for location relative to the DC system for sensing said magnetic field changes and thereby said DC pulse interrupted ground fault signal and thereby providing for detecting the location of the low level ground leakage current in the relatively high capacitive reactance system, said DC system remaining substantially closed and operational during the ground leakage current detection, the pulse interruption rate being less than about 2 times per second.

4,929,902

MULTIPLE SIZE CABLE TESTING DEVICE

William A. Nelson, III, R.D. 1, Box 300, Old York Rd., Ringoes, N.J. 08551

Filed Apr. 7, 1989, Ser. No. 334,729

Int. Cl.[5] G01R *31/02*

U.S. Cl. 324—542 **20 Claims**

1. A multiple size coaxial cable testing device for signaling the malfunction of a particular wire of a three wire coaxial cable, which comprises:

(a) a housing;

(b) a transmitter-analyzer unit located in said housing which contains:

(i) an on/off switch;

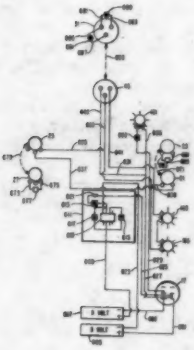
(ii) a power source;

(iii) wiring;

(iv) a circuit board with resistors to regulate current flow;

(v) three or more different size, three-wire coaxial cable connectors, including one cable connector for receiving a plug at one end of a first cable of a defined size, one cable connector for receiving a plug at one end of a second cable of a different defined size, and one cable connector for receiving a microphone cable plug of a size different from those of said first and said second cables; and,

(vi) at least two signal lights; wherein said power source is connected to each of said cable connectors through said circuit board via said wiring, and said signal lights are connected to the wiring to signal the malfunction of a particular wire of a three-wire coaxial cable when tested; and,



(c) a receiver unit for receiving current from the transmitter-analyzer unit and returning current to it when a cable is tested, said receiver unit located at least in part in said housing, which receiver unit contains:

(i) three or more different size, three-wire coaxial cable connectors of the same type and size as the connectors of said transmitter-analyzer, at least one of said cable connectors being removably attached to said housing for connection to the opposite end of a cable to be tested;

(ii) each of said connectors having wiring; and,

(iii) diodes and/or resistors;

wherein said diodes and/or resistors are connected via said wiring to the three-wire cable connectors so as to complete a circuit for testing in conjunction with said transmitter-analyzer unit when the on/off switch is on and a plug at one end of a cable to be tested is connected to a connector of said transmitter unit and the plug at the opposite end of cable to be tested is connected to a connector of said receiver unit.

4,929,903

METHOD OF AND APPARATUS FOR ASSESSING INSULATION CONDITIONS

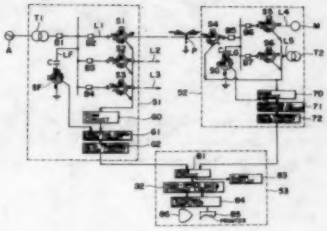
Akira Saigo, Chiba; Shigenari Maezawa, Kashiwa; Tomoki Kageyama, Kuga; Keizaburo Ishikura, Kuga; Akio Sera, Kuga, and Junji Suehiro, Otake, all of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Aug. 5, 1988, Ser. No. 228,578

Claims priority, application Japan, Aug. 7, 1987, 62-197812; Feb. 17, 1988, 63-34800; Feb. 26, 1988, 63-43529; Feb. 29, 1988, 63-47213

Int. Cl.[5] G01R *31/02*

U.S. Cl. 324—544 **8 Claims**



1. An apparatus for detecting deterioration in insulation of electrical equipment and cables, comprising a first coil **1** composed of two primary windings **11**, **12** and a secondary winding **13** wound on a core whose magnetomotive force and magnetic flux density are approximately proportional to each other, said primary windings **11** and **12** being wound with the same number of turns and in the same direction,

a second coil **2** composed of a primary winding **21** and a secondary winding **22** wound on a core whose magnetomotive force and magnetic flux density are approximately proportional to each other, and

an impedance circuit **3**,

the terminals **21-*a*** and **21-*b*** of the primary winding **21** in the second coil **2** being respectively connected to the winding end terminal **11-*b*** of the primary winding **11** and the winding end terminal **12-*b*** of the primary winding **12** in the first coil **1**, said impedance circuit **3** being connected to the winding end terminal **11-*b*** of the primary winding **11** and the winding start terminal **12-*a*** of the primary winding **12** in the first coil **1**, a signal indicative of deterioration in insulation of electrical equipment or cables being obtained at the terminals **13-*a*** and **13-*b*** of the secondary winding **13** in the first coil **1** or at the terminals **22-*a*** and **22-*b*** of the secondary winding **22** in the second coil **2** when the winding start terminal **11*a*** of the primary winding **11** and the winding start terminal **12-*a*** of the primary winding **12** in the first coil **1** are connected to the shielding case of said electrical equipment or the shield of said cable and the ground, respectively.

4,929,904

MOISTURE SENSING APPARATUS WITH MOVABLE PROBE IN COMBINATION WITH AN AGRICULTURAL BALER HAVING A PICKUP

Carl E. Bohman, and Shaun A. Seymour, both of New Holland, Pa., assignors to Ford New Holland, Inc., New Holland, Pa.

Filed Jul. 24, 1989, Ser. No. 383,694

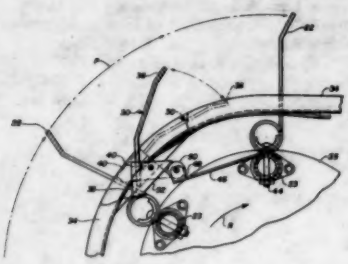
Int. Cl.[5] G01R *27/14*

U.S. Cl. 324—696 **10 Claims**

1. In combination with an agricultural baler having a pickup including a plurality of tines movable in a preselected path for picking up crop material and a bale case in which crop material is formed into bales, moisture sensing apparatus comprising:

a probe mounted on said pickup for movement between a retracted position and an operative position in order to

check the moisture content of the crop material being picked up by said tines before it enters said bale case; and



means actuated when said tines move in said preselected path for moving said probe from said retracted position to said operative position and into the crop material picked up by said tines.

4,929,905

SYNCHRONOUS DEMODULATION CIRCUIT FOR A CARRIER-MODULATED TELEVISION SIGNAL

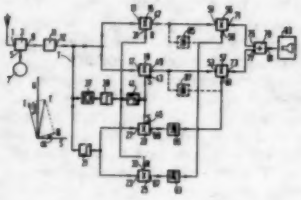
Leonardus J. M. Ruitenburg, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 6, 1989, Ser. No. 320,133

Claims priority, application Netherlands, Mar. 7, 1988, 8800555

Int. Cl.[5] H03D *1/00*

U.S. Cl. 329—358 **9 Claims**



1. A synchronous demodulation circuit for a carrier-modulated television signal (T), comprising a passive carrier regeneration circuit for obtaining an in-phase (R) and quadrature reference signal (S) for synchronously demodulating the television signal in an in-phase and a quadrature demodulator, respectively, outputs of the in-phase and quadrature demodulators being coupled, respectively, to a first and a second input, respectively, of a combination circuit having an output from which a video signal is obtained, characterized in that the synchronous demodulation circuit further comprises a first and a second multiplier having respective inputs coupled via at least a first and a second low-pass filter, respectively, to corresponding outputs of a circuit for obtaining a synchronous in-phase and a quadrature-demodulated television signal, said first and second multipliers being arranged in such a manner that the amplitudes of the signals at the first and the second input, respectively, of the combination circuit are also substantially proportional to that of the signals at said respective inputs of the multipliers.

4,929,906

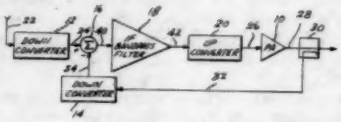
AMPLIFIER LINEARIZATION USING DOWN/UP CONVERSION

Kenneth G. Voyce, Bellevue, and Jay H. McCandless, Issaquah, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Jan. 23, 1989, Ser. No. 299,950

Int. Cl.[5] H03F *1/32*; H03C *1/06*

U.S. Cl. 330—149 **13 Claims**



1. A circuit for linearizing an amplifier, the amplifier having input and output terminals and means for amplifying an amplifier input signal at the input terminal to produce an amplifier output signal at the output terminal, the circuit comprising:

first down conversion means for receiving an RF input signal to be amplified and for down converting the RF input signal to produce a first IF signal;

coupler means connected to the output terminal of the amplifier, the coupler means including means for dividing the amplifier output signal to produce an RF output signal and a feedback signal;

second down conversion means connected to the coupler means for down converting the feedback signal to produce a second IF signal;

combining means connected to the first and second down conversion means for subtracting one IF signal from the other IF signal to produce a difference signal;

up conversion means connected to the combining means and to the input terminal of the amplifier, for up converting the difference signal to produce the amplifier input signal and for coupling the amplifier input signal to the input terminal of the amplifier.

4,929,907

OUTPUT AMPLIFIER

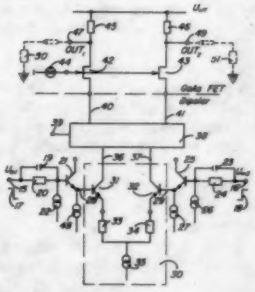
Werner Berkel, Weil der Stadt, Fed. Rep. of Germany, assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Mar. 8, 1989, Ser. No. 320,672

Claims priority, application European Pat. Off., Mar. 9, 1988, 88103693.3

Int. Cl.[5] H03F *3/45*

U.S. Cl. 330—252 **6 Claims**



1. An output amplifier for high output swing in pulse generators, comprising a first bipolar transistor linear amplifier stage receiving an internal pulse signal, and a second amplifier stage

which is controller by the output of said first amplifier stage and comprises at least one field-effect transistor, in which:

said first bipolar transistor linear amplifier stage comprises a high gain differential amplifier with differential inputs and differential outputs;

said second amplifier stage comprises two gallium arsenide field-effect transistors for providing high output voltage swing;

said two gallium arsenide field-effect transistors are wired as a common gate;

means for applying a constant voltage to said common gate, and

a multiplier stage having an adjustable multiplication factor, provided by an adjustable input connection, connecting said first amplifier stage to said second amplifier stage.

4,929,908

GAIN CONTROLLABLE AMPLIFIER CIRCUIT

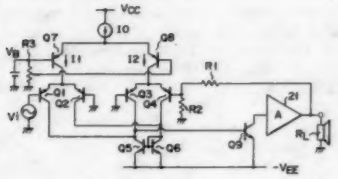
Kazuo Imanishi, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 28, 1989, Ser. No. 344,775

Claims priority, application Japan, May 2, 1988, 63-109313

Int. Cl.[5] H03F *3/45*; H03G *3/30*

U.S. Cl. 330—254 **10 Claims**



1. An amplifier circuit comprising:

first voltage-current converter means for converting an input signal voltage into a corresponding first output current;

second voltage-current converter means for converting a negative feedback signal voltage into a corresponding second output current, said second voltage-current converter having first and second input terminals to which a DC voltage of a predetermined level and the negative feedback signal voltage are applied, respectively;

coupling means for coupling said first and second output currents of said first and second voltage-current converter means, and for generating an output voltage corresponding to the sum of said first and second output currents;

voltage amplifier means for applying the output voltage of said coupling means;

feedback means for supplying part of the output voltage of said voltage amplifier means as the negative feedback signal voltage only to the second inputs terminal of said second voltagecurrent converter means, the DC voltage level of the output voltage of said voltage amplifier means being determined in accordance with both the negative feedback signal voltage supplied from said feedback means and the DC voltage of the predetermined level; and

control means for controlling the ratio of the mutual conductances of said first and second voltage-current converter means.

4,929,909

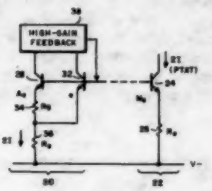
DIFFERENTIAL AMPLIFIER WITH GAIN COMPENSATION

Barrie Gilbert, Beaverton, Oreg., assignor to Analog Devices, Inc., Norwood, Mass.

Filed Mar. 27, 1989, Ser. No. 328,946

Int. Cl.[5] H03F *3/45*

U.S. Cl. 330—256 **10 Claims**



1. A gain-compensated differential amplifier circuit comprising:

(a) a transistor differential amplifier, with reasonably matched current gains, operating at a tail current I_{tail};

(b) a transistor current source responsive to a control voltage for generating said tail current as a function of the control voltage;

(c) control voltage generating means for generating, as the control voltage, a voltage which varies proportionately to absolute temperature; and

(d) the control voltage generating means including means for functionally relating the control voltage to the intrinsic emitter resistance of the current source.

4,929,910

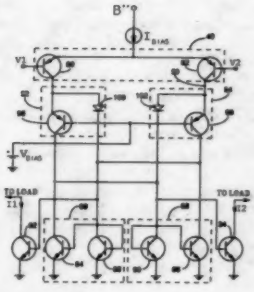
LOW CURRENT AMPLIFIER WITH CONTROLLED HYSTERESIS

Gary L. Pace, and David H. Overton, both of Boca Raton, Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 10, 1989, Ser. No. 377,033

Int. Cl.[5] H03F *3/45*

U.S. Cl. 330—257 **14 Claims**



1. An amplifier comprising:

a current source;

a differential amplifier for receiving a first input voltage and a second input voltage, said amplifier coupled to said current source and having a first output and a second output;

a first current mirror having an input and an output;

a second current mirror having an input and an output, said input and output cross-coupled to the output and input, respectively, of said first current mirror;

first means for preventing voltage saturation across said second current mirror, having a first and second input and

a first and second output, said first input coupled to said first output of said differential amplifier, said second input for coupling to a first supply voltage, said first output coupled to said input of said first current mirror, and said second output coupled to said output of said first current mirror; and

second means for preventing voltage saturation across said first current mirror, having a first and second input and a first and second output, said first input coupled to said second output of said differential amplifier, said second input for coupling to said first supply voltage, said first output coupled to said input of said second current mirror, and said second output coupled to said output of said second current mirror.

4,929,911

PUSH-PULL OUTPUT CIRCUIT HAVING THREE TRANSISTORS

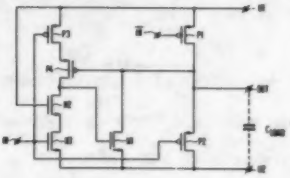
Thomas J. Davies; Evert Seevinck, both of Eindhoven, Netherlands; Leonardus C. M. G. Pfennings, deceased, late of Sittard; Henricus J. Kennen, Valkenswaard, both of Netherlands (legal representative); Peter H. Voss, Eindhoven; Cormac M. O'Connell, Eindhoven; Cathal G. Phelan, Eindhoven, and Hans Ontrop, Eindhoven, all of Netherlands, assignors to U.S. Philips Corp., New York, N.Y.

Filed May 22, 1989, Ser. No. 296,462

Claims priority, application Netherlands, Jan. 14, 1988, 8800075

Int. Cl.[5] H03F *3/26*

U.S. Cl. 330—264 **5 Claims**



1. A push-pull output circuit comprising first and second output transistors, in which current channels of the first and second output transistors are connected between a first power supply terminal and an output terminal and between the output terminal and a second power supply terminal, respectively, the first output transistor being a p-type transistor, a first and a second output terminal being coupled to a control electrode of the first and the second output transistor, respectively, which input terminals receive a logic input signal and the inverse thereof, respectively, characterized in that the second output transistor is also a p-type transistor and in that a third output transistor of the n-type is provided, the current channel of said third transistor being connected directly in parallel with the current channel of the second output transistor, and in that detection means for turning on the third output transistor when the voltage on the output terminal drops below the predetermined voltage level are coupled to said third transistor.

4,929,912

CURRENT MIRROR CIRCUIT, AND VIDEO OUTPUT AMPLIFIER CIRCUIT PROVIDED WITH THE CURRENT MIRROR CIRCUIT

Pieter G. Blanken, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

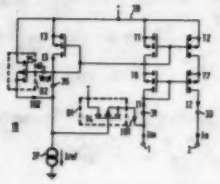
Filed Dec. 1, 1988, Ser. No. 280,103

Claims priority, application Netherlands, Dec. 10, 1987, 8702980

Int. Cl.[5] H03F *3/16*

U.S. Cl. 330—288 **12 Claims**

1. A current mirror circuit being provided with a current mirror, an input and an output of which are coupled to an input and an output, respectively, of the current mirror circuit, and a limiter circuit comprising a reference current source and a unilaterally conducting element which includes a transistor, a source electrode of which is coupled to the input of the current mirror circuit, characterized in that a control electrode of the



transistor is coupled to the reference current source, to a further output of the current mirror and to a reference voltage terminal via a further unilaterally conducting element, and in that a drain electrode of the transistor is coupled to a power supply terminal.

4,929,913

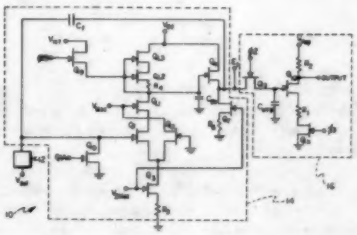
GAAS FOCAL PLANE ARRAY READOUT

Robert N. Sato, Palos Verdes Estates, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Aug. 14, 1989, Ser. No. 393,193

Int. Cl.[5] H03F *3/08, 3/16*

U.S. Cl. 330—308 **13 Claims**



1. A capacitive feedback transimpedance amplifier comprising:

means, having an input terminal for coupling to an output signal of an infrared detector, for amplifying the detector output signal to produce at an amplifier output terminal an output signal;

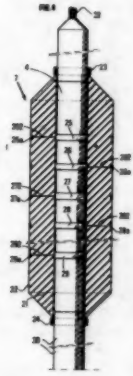
means, coupled between said output terminal and said input terminal, for capacitively feeding back to said input terminal a feedback signal having a magnitude related to a magnitude of said output signal; and

load means coupled between said amplifier means output terminal and a source of amplifier means power, said load means comprising a resistor having a first terminal coupled to said output terminal and a second terminal coupled to a first load transistor, said first load transistor further being serially coupled to a second load transistor, a control terminal of each of said first and said second load transistors being coupled to said output terminal.

4,929,915
PROTECTIVE DEVICE FOR ENLARGING THE EFFECTIVE DIAMETER OF A PROBE IN LARGE DIAMETER WELLS

Christian Wittrisch, Rueil-Malmaison, France, assignor to Institut Francais du Petrole, Rueil-Malmaison, France

Filed Jul. 2, 1987, Ser. No. 69,174
Claims priority, application France, Feb. 27, 1987, 87 02757
Int. Cl.[5] G01V *3/20, 3/28, 5/04*
U.S. Cl. 324—347 **8 Claims**



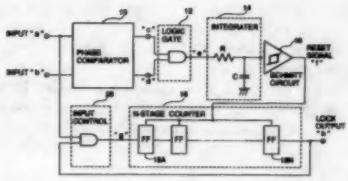
1. A protective device for a logging probe having a longitudinal axis and having a small diameter relative to a well in which the probe is to operate, said device comprising a rigid tubular-like casing adapted to be connected to the probe and acting to enlarge the effective diameter of the probe in comparison with the well diameter, fastening means for locating said rigid casing coaxially on the probe and for fastening the casing circumferentially around the probe on at least one level of said probe, said rigid casing having an exterior surface longitudinally surrounding at least an active part of said probe for carrying out the logging measurement, said casing being capable of transmitting a signal emitted and/or received by said probe without substantial attenuation on the signal, wherein the exterior surface of the casing is spaced from the active part of the probe thereby enlarging the effective diameter of the probe and the fastening means for the casing are located on the probe so that mechanical stresses occurring in the well are applied and transmitted along the exterior surface of ssid casing without adversely acting on the active part of the probe; said probe being provided with electrodes on an exterior surface, said casing including electrodes located along the longitudinal axis of the casing, each of said electrodes being associated with an electrode of the probe and at least one of the electrodes on the casing being electrically connected to an electrode on the probe by an electrical connection extending through a space defined between the probe and the casing.

4,929,916
CIRCUIT FOR DETECTING A LOCK OF A PHASE LOCKED LOOP

Shinri Fukuda, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Mar. 10, 1989, Ser. No. 321,685
Claims priority, application Japan, Mar. 10, 1988, 63-57481
Int. Cl.[5] H03L *7/08*
U.S. Cl. 331—1 A **4 Claims**

1. A circuit for detecting a lock of a phase locked loop comprising phase comparison means receiving a first signal and a second signal for generating a phase difference signal, waveform shaping means connected to receive the phase difference signal for generating an output signal when the phase difference signal indicates a phase difference exceeding a predetermined value, a multi-stage counter having a frequency division function and having a reset input connected to receive the output signal of the waveform shaping means, input control means connected to receive the first signal and an output of the

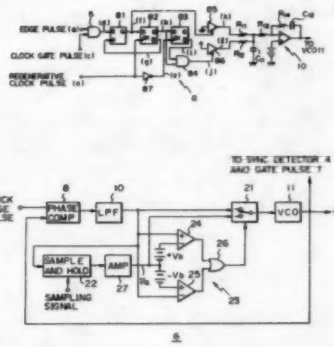


multi-stage counter and having an output connected to an input of the multi-stage counter for allowing the first signal to be applied to the multi-stage counter only when the output of the multi-stage counter is at a predetermined logic level, the output of the counter providing an lock output.

4,929,917
PHASE-LOCKED LOOP CIRCUIT

Fumihiko Yokogawa, Saitama, and Ryuichi Naito, Tokorozawa, both of Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Dec. 22, 1988, Ser. No. 288,575
Claims priority, application Japan, Jul. 15, 1988, 63-176651
Int. Cl.[5] H03L *7/08;* **G11B** *5/02*
U.S. Cl. 331—1 A **5 Claims**



1. A recording medium drive apparatus which drives a recording medium on which clock marks are recorded to produce a read signal having a period which may vary about a clock period T_p, comprising:

a phase-locked loop (PLL) circuit for producing a clock signal comprising:

phase comparator means having a linear characteristic range of $\pm\alpha$, wherein said phase comparator means produces a clock control signal having a magnitude which varies depending upon a phase difference between the clock signal and the read signal; and

variable frequency oscillator means for generating the clock signal so that the frequency of said clock signal varies in response to the magnitude of said clock control signal;

wherein the following relation stands:

$$|\omega_n \zeta| \leq |\alpha / 2\pi \cdot T_s|$$

where ω_2 and ζ are the natural angular frequency and the damping factor of the PLL loop, respectively.

3. A recording medium drive apparatus which drives a recording medium on which clock marks are recorded to produce a read signal having a period which may vary about a clock period T_s, comprising:

a phase-locked loop (PLL) circuit for producing a clock signal comprising:

phase comparator means having a linear characteristic range, wherein said phase comparator means produces a clock control signal having a magnitude which varies depending upon a phase difference between the clock signal and the read signal;

variable frequency oscillator means for generating the clock signal so that the frequency of said clock signal varies in response to the magnitude of said clock control signal; and

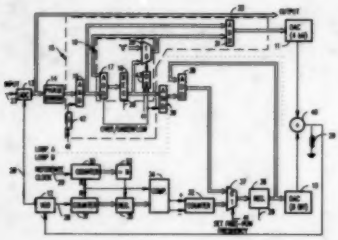
level limiter means for preventing the magnitude of said clock control signal from exceeding a predetermined value.

4,929,918

SETTING AND DYNAMICALLY ADJUSTING VCO FREE-RUNNING FREQUENCY AT SYSTEM LEVEL

Paul W. Chung; Ralph L. Gee, both of San Jose; Luke C. K. Lang, Santa Clara, and Paik Saber, San Jose, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 7, 1989, Ser. No. 363,566
Int. Cl.[5] H03L *7/113*
U.S. Cl. 331—10 **13 Claims**



1. A method for setting the free-running frequency of a VCO that forms part of a PLL comprising the steps of:

at system power on, disabling the PLL and setting a DAC and the PLL to a value corresponding substantially to the center of a preselected frequency lock range;

supplying the VCO output pulses to a first counter;

supplying pulses from a reference clock to a second counter;

when the second counter counts to a preselected count, storing the count then in said first counter in a register and resetting both counters;

comparing the stored count with a preselected expected count corresponding to said value; and

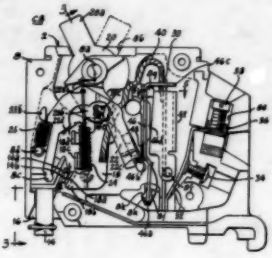
incrementing or decrementing the VCO frequency according to whether the stored count is lower or higher than the expected count.

4,929,919

TWIN UNIT CIRCUIT BREAKER WITH IMPROVED MAGNET STRUCTURE

Donald A. Link, Hubertus; Dean A. Hubbard, Sussex, and Michael R. Larsen, Milwaukee, all of Wis., assignors to Eaton Corporation, Cleveland, Ohio

Filed Jun. 27, 1988, Ser. No. 211,739
Int. Cl.[5] H01H *75/10*
U.S. Cl. 335—38 **25 Claims**



1. A current responsive circuit breaker comprising:

an insulating housing;

a stationary contact mounted in said housing;

a movable contact in said housing engagable with said stationary contact;

magnetic current sensing means in said housing comprising a pole piece having a pair of pole faces thereon and an armature pivotally mounted in spaced proximity to said pole faces, said armature being movable into engagement with said pole faces;

means operable to effect separation of said movable contact from said stationary contact in response to movement of said armature toward engagement with said pole faces; and

metallic bearing means mounted in said housing, said bearing means having a smooth surface trough and said armature having a blade edge pivot received in said trough.

4,929,920

COMPACT CIRCUIT BREAKER WITH AN ELECTRONIC TRIP UNIT

David J. Meiners, Southington; Robert A. Morris, Burlington; David Arnold, Chester; Roger N. Castonguay, Terryville, and Joseph M. Palmieri, Southington, all of Conn., assignors to General Electric Company, New York, N.Y.

Filed Jun. 23, 1989, Ser. No. 370,948
Int. Cl.[5] H01H *9/02*
U.S. Cl. 335—202 **8 Claims**

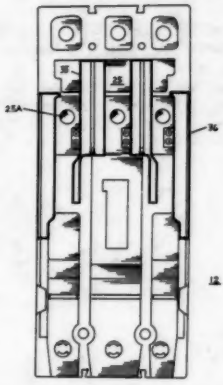
1. A circuit breaker comprising:

a molded plastic circuit breaker case and cover;

a pair of separable contacts within said case and arranged for separation upon occurrence of an overcurrent condition by means of an operating mechanism and an electronic trip unit;

a plurality of current transformers within said case under said trip unit and connected with said trip unit by pin

connectors projecting through said circuit breaker cover and said trip unit; and



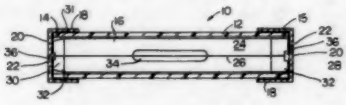
reinforcing ribs integrally-formed within a bottom of said circuit breaker cover to provide added strength to said circuit breaker cover during said overcurrent condition.

4,929,921

AUTOMATABLE FUSE

Varinder K. Kalra, Chesterfield, and Keith A. Spalding, Fenton, both of Mo., assignors to Cooper Industries, Inc., Houston, Tex.

Filed Mar. 16, 1989, Ser. No. 324,474
Int. Cl.[5] H01H *85/16*
U.S. Cl. 337—233 **25 Claims**



1. A fuse, comprising:
an insulating housing having opposed electrically conductive end caps;
a bridge having opposed ends disposed within said housing and extending between said end caps;
a fusing wire disposed on said bridge;
a metal foil disposed on at least one side of the ends of said bridge; and
solder connecting said fusing wire and metal foil to one of said end caps.

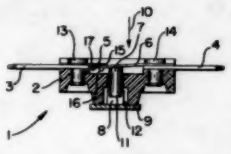
4,929,922

TEMPERATURE SAFETY DEVICE FOR ELECTRIC DEVICES

Walter Hollweck, Heroldsberg, Fed. Rep. of Germany, assignor to Inter Control Hermann Kohler Elektrik GmbH

Filed Dec. 20, 1988, Ser. No. 287,336
Claims priority, application Fed. Rep. of Germany, Dec. 24, 1987, 3744238
Int. Cl.[5] H01H *37/76*
U.S. Cl. 337—407 **13 Claims**

1. In a temperature safety device of the type having an electrically insulative support, electrical connectors extending outwardly of the support, first and second contact elements having first fixed ends connected with said electrical connectors and free ends engageable to provide a switch within the support in series circuit with said electrical connectors, a melt material insert adapted for heat transfer relative with apparatus being protected by the safety device, and a mechanical force transfer element disposed between said insert and said second contact element and applying force thereto to effect closure of said contact elements in part attributable to counter-forces exerted by said contact elements, the improvement wherein said device first contact element has a lower directional quan-



tity at its free end that the directional quantity of said second contact element at its free end, and wherein said device includes stop means disposed by said support in confronting relation with said first contact element and coactive therewith upon melting of said insert to limit movement of said first contact element, thereby to enhance opening of said switch and interruption of said series circuit.

4,929,923

THIN FILM RESISTORS AND METHOD OF TRIMMING

Vineet S. Dharmadhikari, Palm Bay, Fla., assignor to Harris Corporation, Melbourne, Fla.

Filed May 26, 1989, Ser. No. 357,898
Int. Cl.[5] H01C *1/012*; B23K *26/00*
U.S. Cl. 338—308 **17 Claims**

1. A method of trimming resistors in an integrated circuit comprising:
forming a first resistor on a substrate having a first portion of a first material having a first resistivity and a second portion of a second material having a second resistivity substantially smaller than said first resistivity; and
trimming at least a selective portion of said second portion of said first resistor to increase the total resistance of said resistor over a range of resistances.

4,929,924

ELECTRONIC ALARM HORN

William P. Buyak, New Hartford; Bruce V. Testa, Cromwell, and Robert W. Right, Huntington, all of Conn., assignors to General Signal Corporation, Stamford, Conn.

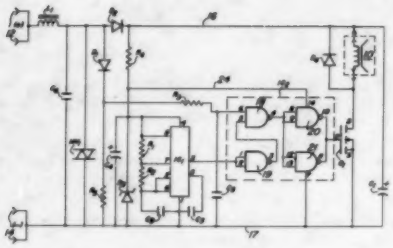
Filed Jan. 27, 1989, Ser. No. 303,516
Int. Cl.[5] G08B *3/00*
U.S. Cl. 340—384 E **6 Claims**

1. An electronic horn for alarm systems of the type in which an alarm condition is indicated by a reversal of polarity in the d.c. power supply for said horn, comprising:
a pair of terminals for connection to said d.c. power supply;
a series circuit including a current limiting element, a diode

and a capacitor connected across said terminals and operable to charge said capacitor when the polarity of said d.c. supply appearing at said terminals is that which indicates an alarm condition;

a speaker operable to produce sound in response to current flow through said speaker, said speaker being constructed so that it will reverberate for a period after said current flow through said speaker has stopped;

switch means for connecting said speaker in parallel to said capacitor for the discharge of energy stored in said capacitor through said speaker when said switch means is in its conductive state; and



means for continuously cycling said switch means between its conductive and non-conductive states at a predetermined frequency and with a predetermined percentage of "on" time for each cycle such that the sound produced by current pulses through said speaker resulting from said cycling combines with that produced by the reverberant characteristic of the speaker when the current pulses through the speaker are cut off to provide a continuous tone as long as said pair of terminals is connected to said power supply in the polarity indicative of an alarm condition.

4,929,925

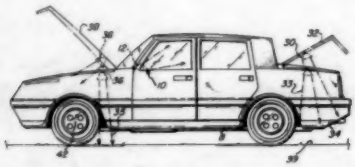
ALARM SYSTEM

David B. Bodine, 25 E. Common Rd., and Joseph R. Farkas, 52 Tersana Dr., both of Easton, Conn. 06612

Filed Feb. 24, 1988, Ser. No. 161,199

Int. Cl.[5] B60R *25/10*; B60Q *1/00*

U.S. Cl. 340—426 **11 Claims**



1. An alarm system for detecting movement of a vehicle upwardly from a surface supporting said vehicle, said alarm system comprising:

transducer means, facing downwardly toward said surface, for transmitting a sonic wave toward and receiving an echo from said surface;

an alarm;

electronic means for activating said transducer means to transmit a sonic wave and receive an echo and thereby determine a parameter indicative of a reference distance from said transducer means to said support surface; and

means for periodically activating said transducer means and comparing current data corresponding to the distance from said transducer means to said support surface to said reference distance, and activating said alarm if said current data indicates a current distance that is significantly greater than said reference distance.

4,929,926

INTRUSION DETECTION BARRIER

Chaim Porat, Beer Sheba, Israel, assignor to Magal Security Systems, Ltd., Israel

Filed Apr. 13, 1989, Ser. No. 337,675

Claims priority, application Israel, May 6, 1988, 86294

Int. Cl.[5] G08B *13/00*; H01H *3/02*

U.S. Cl. 340—541 **20 Claims**

1. An intrusion detection barrier, comprising: a coiled wire fence deployable over the ground or over another fence; a sensor wire tensioned between a pair of wire-supporting posts anchored in the ground; an intrusion detector connected to said sensor wire to sense any change in tension thereof; and coupling members coupling said sensor wire to spaced points of said coiled wire fence.

4,929,927

SURVEILLANCE INSTALLATION

Per A. Uhlin, Backen, Stensfält, 54500 Töreboda, Sweden

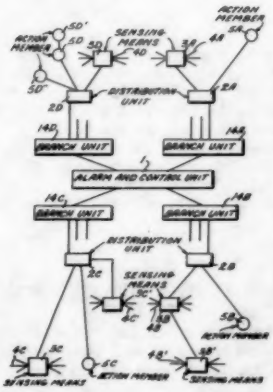
PCT No. PCT/SE86/00359, § 371 Date Apr. 20, 1987, § 102(e) Date Apr. 20, 1987, PCT Pub. No. WO87/01226, PCT Pub. Date Feb. 26, 1987

PCT Filed Aug. 8, 1986, Ser. No. 50,000

Claims priority, application Sweden, Aug. 19, 1985, 8503863

Int. Cl.[5] G08B *13/08*

U.S. Cl. 340—547 **18 Claims**



1. An intrusion detection system for protecting an area of ground at ground level, a central monitoring and control unit, a plurality of distribution units placed at selected locations in said area of ground to be protected, said distribution units being wired in circuit relationship with said central monitoring and control unit, a plurality of sensing means wired in circuit relationship with said distribution units, each sensing means

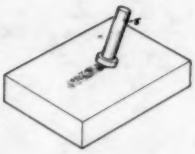
comprising an electric switch in said circuit relationship, a movable magnetic operator for said switch, said switch being in a first switching position when said movable magnetic operator is in close proximity thereto, said switch moving to a second switching position when released by moving said magnetic operator away from said switch, an elongated strand means connected to said magnetic operator and inconspicuously deployed over a portion of said area of ground, said elongated strand means connected to said magnetic operator and inconspicuously deployed over a portion of said area of ground comprises a net, said strand means being tripped by movement of an intruder to pull said magnetic operator away from said switch to generate an alarm signal when said switch moves from said first position to said second position, and a low voltage direct current supply in said control unit for supplying direct current operating power for said intrusion detecting system.

4,929,928

MAGNETIZED INK, PAINT OR DYE USED ON MERCHANDISE TO PREVENT THEFT

Eric Hultåker, Västerås, Sweden, assignor to AB Aros Avancerad Butikskontroll, Västerås, Sweden

Filed Feb. 19, 1988, Ser. No. 157,983
Claims priority, application Sweden, Feb. 20, 1987, 870713-4
Int. Cl.[5] G08B *13/14*
U.S. Cl. 340—572 12 Claims



1. A printing medium selected from the group consisting of ink, dye and paint for use in applying an anti-theft marking to articles, said printing medium containing particles of at least two different magnetizable materials, said materials differing in permeability and/or particle size, wherein said particles are intended to be magnetized when the printing medium is applied on an article or on a layer of a printing medium already applied to an article.

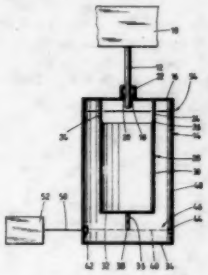
4,929,929

LEAKAGE CONTROL MECHANISM

Eike Romer, Seevetal, Fed. Rep. of Germany, assignor to Dipl.-Ing. Wrede & Niedecken Verwaltung GmbH, Fed. Rep. of Germany

Filed May 30, 1989, Ser. No. 358,885
Claims priority, application Fed. Rep. of Germany, May 31, 1988, 3818416
Int. Cl.[5] G08B *23/00*; G01F *23/20*
U.S. Cl. 340—613 12 Claims

1. Leakage control mechanism for aggregates (10) containing liquid and/or with liquid running through them, with a receptacle (28) for liquid escaping from the aggregate (10), mounted elastically, in vertical direction and equipped with a device (46, 66) for detecting the vertical position of the receptacle (28) and triggering a signal when a pre-set position of lowering is reached by the receptacle (28), in which the receptacle (28) is arranged in a container (14) the lid (16) of which



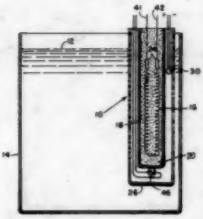
has an opening (18, 60) for inserting a feed-pipe (12) for the leakage liquid.

4,929,930

LIQUID LEVEL CONTROLLER UTILIZING THE RATE OF CHANGE OF A THERMOCOUPLE

Dennis J. Rezabek, Kirkland, Ohio, assignor to Process Technology Inc.

Filed Oct. 24, 1988, Ser. No. 261,314
Int. Cl.[5] G08B *21/00*
U.S. Cl. 340—622 30 Claims



1. A level controller for sensing the level of a containerized fluid comprising a heater element, a temperature sensitive element operatively associated with said heater element, said temperature sensitive element establishing a first signal indicative of the temperature at a location adjacent said heater element, which temperature is indicative of whether said temperature sensitive element is immersed in the fluid, first means for setting a predetermined maximum rate of change for said first signal which is indicative that said temperature sensitive element is sensing a temperature rise in excess of a predetermined maximum rate and that the temperature sensitive element is not immersed in the fluid and control means responsive to said first signal for establishing a second signal in the event that the rate of change of said first signal exceeds said predetermined maximum rate of change for said first signal.

4,929,931

BATTERY MONITOR

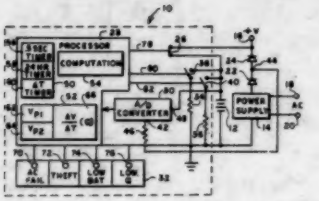
Steven W. McCuen, Lake Zurich, Ill., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 22, 1988, Ser. No. 289,601
Int. Cl.[5] G08B *21/00*; G01N *27/46*
U.S. Cl. 340—636 16 Claims

1. A battery monitor for monitoring the condition of a battery utilized within a system as the primary or auxiliary power source of said system, said battery monitor comprising:

voltage measuring means for measuring the voltage of said battery; and

processor means coupled to said voltage measuring means for utilizing the voltage measurement of said voltage measuring means, said processor means being arranged to test said battery by determining responsive to said voltage measuring means, the presence or absence of said battery, whether the battery voltage is equal to or greater than a



nominal voltage level, and the discharge rate of said battery, said processor means being adapted to compare said battery voltage to a first predetermined voltage level to determine the presence or absence of said battery, said processor means further being adapted to compare said battery voltage to a second predetermined voltage level to determine whether said battery voltage is equal to or greater than said nominal voltage.

4,929,932

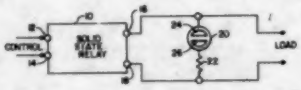
SOLID STATE RELAY HAVING VISUAL CONTACT MONITOR

James P. Shipkowski, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 24, 1989, Ser. No. 342,772

Int. Cl.[5] G08B *21/00*

U.S. Cl. 340—644 **8 Claims**



1. Solid state relay apparatus for switching an electrical load between two output terminals, said apparatus comprising:

relay means for electrically connecting said output terminals together in a first mode of operation and for isolating said output terminals in a second mode of operation; and

a visual indicator effectively connected in parallel across said output terminals, said indicator including means for visually indicating when a voltage is across the indicator and the polarity of any DC voltage across the indicator.

4,929,933

DIGITAL COLOR VIDEO MONITOR

Les L. McBeath, Elmhurst; Amir M. Sheikholeslami, Arlington Heights, and Glenn T. Turro, Oak Park, all of Ill., assignors to Zenith Electronics Corporations, Glenview, Ill.

Filed Jul. 30, 1987, Ser. No. 79,369

Int. Cl.[5] G09G *1/28*

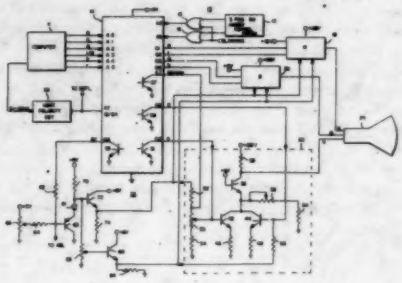
U.S. Cl. 340—703 **8 Claims**

1. A video processing system comprising:

means selectively providing a first and a second plurality of address signals, corresponding to two groups of logic level color video input signals including R, B, G and I, and R, B, G, r, b and g and a logic level control signal, respectively;

PROM means having a plurality of memory locations addressable by said plurality of address signals for developing corresponding open collector logic level color video output signals including R, G, B, r, g, and b;

amplifier means including Red, Green and Blue amplifiers supplied with said R, r; B, b; and G, g logic level color



video output signals, respectively and producing analog signals therefrom; and

said PROM developing a brightness compensation signal for altering the magnitude of said analog signals as a function of said control signal.

4,929,934

PRESSURE-SENSITIVE INPUT APPARATUS

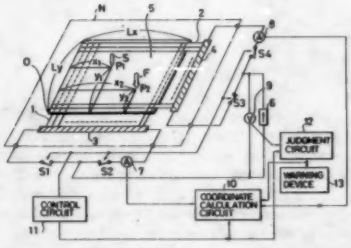
Kenichi Ueda; Kouji Hattori; Akihiko Terada, and Kazuyoshi Inohara, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Sep. 22, 1988, Ser. No. 247,782

Claims priority, application Japan, Sep. 28, 1987, 62-240961

Int. Cl.[5] G08C *21/00*

U.S. Cl. 340—706 **11 Claims**



1. A pressure-sensitive input apparatus comprising:

vertical electrodes which are parallel with each other;

horizontal electrodes which are parallel with each other, intersect said vertical electrodes and are separated from the vertical electrodes;

the electrical resistance between said vertical electrodes and said horizontal electrodes being reduced at a location where a pressure is applied;

an X-coordinate detection resistive member connected to the vertical electrodes;

a Y-coordinate detection resistive member connected to the horizontal electrodes;

current supply means for supplying an electric current through said vertical electrodes, said horizontal electrodes, said X-coordinate detection resistive member and said Y-coordinate detection resistive member;

coordinate calculating means for detecting currents through said X-coordinate detection resistive member and said Y-coordinate detection resistive member and calculating the positional coordinate at which a pressure is applied;

switching means for on-off control of the current flowing

through both ends of the X-coordinate detection resistive member and the Y-coordinate detection resistive member;

voltage detection means for detecting the voltage between the X-coordinate detection resistive member and the Y-coordinate detection resistive member;

judgment means responsive to the voltage detection means for detecting multiple input according to the results obtained from the voltage detection means when the currents are switched by the switching means.

4,929,935

APPARATUS FOR ALIGNING RASTER SCANNED IMAGE TO TOUCH PANEL

Peter B. Rysavy, and Maurice J. Fuller, both of Seattle, Wash., assignors to John Fluke Mfg. Co., Inc., Everett, Wash.

Filed May 2, 1986, Ser. No. 858,679

Int. Cl.[5] G09G 3/02

U.S. Cl. 340—712 **11 Claims**

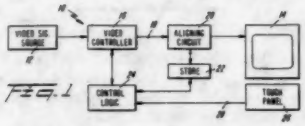


FIG. 1

10. In a display system for generating a raster scan display, having a user input means and a synchronizing signal generating means for generating a synchronizing signal for synchronizing an image displayed on said raster scan display, said synchronizing signal generating means including count registering means for establishing a timing relationship among portions of said synchronizing signal generated thereby and count establishing means for establishing counts for said count registering means to define a timing relationship among portions of said synchronizing signal, the improvement comprising:

said user input means including key means comprising a touch control screen means over said display,

means for generating for display on said raster scan display an alignment screen including therein a plurality of indicia for indicating an alignment of the generated screen relative to predetermined orientation and displacement,

location means responsive to ones of said key means operated by a user for correcting misalignment of the displayed alignment screen relative to said predetermined orientation and displacement, said location means including said count establishing means operable responsively to said said user operated key means to displace said displayed alignment screen in a respective predetermined direction in accordance with a respective one of said alignment key means operated by the user,

by varying respective one of said counts.

4,929,936

LED ILLUMINATED SIGN

Don Friedman, and Thomas T. Chang, both of Las Vegas, Nev., assignors to Home Security Systems, Inc., Las Vegas, Nev.

Filed Mar. 21, 1988, Ser. No. 170,949

Int. Cl.[5] G09G 1/16

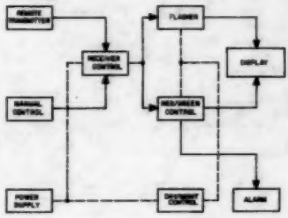
U.S. Cl. 340—715 **10 Claims**

1. An illuminated sign comprises an enclosure, a plurality of display members mounted in the enclosure, each display member comprising a housing, an indicia display panel having a plurality of discrete display segments selectively illuminable to form lighted indicia, each display segment comprising an aligned row of a plurality of LED's,

first electronic circuit means comprising a DC power source, the display segments, and first switch means actuated by a predetermined decrease in ambient lighting for connecting the power source to the display segments, and

second electronic circuit means comprising the DC power source, means for changing the color of the display segments from a first color to a second color comprising a first linear array of LED dices connected in series in each display segment, a second linear array of LED dices connected in series in each display segment, and third switch means for selectively actuating the first or second arrays in each display segment,

second switch means for connecting the power source to the display segments, receiver means for receiving a remotely



generated signal, receiver switch means responsive to the reception of such signal for connecting the DC power source to the display segments, and manual switch means connected to the power source in parallel with the receiver switch means, flasher means for intermittently connecting the DC power source to the display segments, and

a plurality of display segment actuating switches, one for each disply segment, adapted to be manually actuated for selectively disconnecting each display segment from the DC power source such that when the power source is connected to the display members, each indicia display panel displays a preselected indicia.

4,929,937

CIRCUIT FOR GENERATING IMAGE SIGNAL

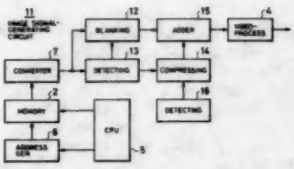
Kouichi Ara, Osaka, Japan, assignor to NEC Home Electronics Ltd., Osaka, Japan

Filed Feb. 25, 1988, Ser. No. 160,375

Claims priority, application Japan, Feb. 27, 1987, 62-44599

Int. Cl.[5] G09G 1/16

U.S. Cl. 340—728 **7 Claims**



1. A circuit for generating an image signal for use in a projection TV receiver, comprising:

a memory means in which data about an image is stored;

an image pattern creating means for successively reading data from the memory means in step with a deflection operation and for creating an image pattern consisting of dots the minimum width of which is determined by the storage capacity of the memory; and

a compressing means which receives data from the image pattern creating means and compresses the width of the dots forming the image pattern, said compressing means

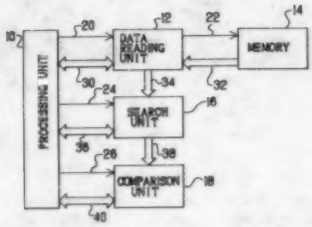
including a detecting means to detect the horizontal edges of the image pattern and delaying means to delay the horizontal edges by a period shorter than the period corresponding to the minimum width of the dots.

4,929,938

AREA SEARCHING SYSTEM

Ryuji Horiguchi, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Feb. 16, 1988, Ser. No. 156,117
Claims priority, application Japan, Feb. 13, 1987, 62-31025
Int. Cl.[5] G09G *1/14*
U.S. Cl. 340—747 **3 Claims**



1. A system for searching a predetermined boundary of a closed pattern comprising a memory for storing data of a given closed pattern, a reading unit for sequentially reading each pair of vertically adjacent words of each pair of vertically adjacent lines of the given closed pattern from the memory in the same data reading direction, a search unit receiving the pair of vertically adjacent words from the reading unit for searching a boundary in each of the pair of vertically adjacent words and for generating data indicative of a position of a boundary found in each of the pair of vertically adjacent words, a comparison unit receiving the boundary position data of the each pair of vertically adjacent words so as to judge in which of the vertically adjacent words the boundary is found earlier than the other, and a processing unit coupled to the comparison unit for determining whether or not the found boundary is the predetermined boundary.

4,929,939

HIGH-SPEED SWITCHING SYSTEM WITH FLEXIBLE PROTOCOL CAPABILITY

Anujan M. Varma, Croton-On-Hudson, and Christos J. Georgiou, White Plains, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 31, 1988, Ser. No. 264,596
Int. Cl.[5] H04Q *1/00*; H03K *17/00*
U.S. Cl. 340—825.800 **16 Claims**

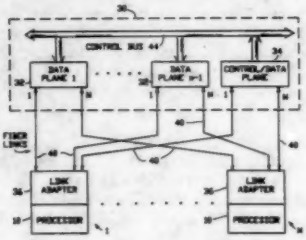
1. A switching system for selectively connecting a plurality of processors, comprising:

a switching station comprising a plurality of switching planes for transferring data therethrough;

a plurality of data links, each of said data links being coupled at a first end thereof to a respective one of said switching planes and at a second end thereof to one of said processors;

at least one of said switching planes being a control/data plane including control means for controlling the transfer therethrough of data and for controlling data transfer through other of said switching planes; and

said switching station being operable in a first mode wherein only said one switching plane is used for data transfer and



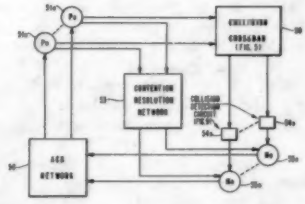
in a second mode wherein said one switching plane and said other switching planes are used for data transfer.

4,929,940

COLLISION CROSSBAR SWITCH

Peter A. Franaszek, Katonah, and Christos J. Georgiou, White Plains, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 18, 1988, Ser. No. 275,164
Int. Cl.[5] H04Q *1/00*
U.S. Cl. 340—825.020 **21 Claims**



1. A collision crossbar switch comprising:

an array of NXM cross-points C_{ij}, said array having N input ports and M output ports, said output ports being connected to corresponding output buses and each of said input ports being selectively connectable to any one of said output buses via said output ports;

current detecting and limiting means for connecting said output ports to said buses for limiting current through said cross-points when a contention occurs as the result of more than one of said input ports being simultaneously connected to any one of said output buses; and

collision detecting means connected to each of said output buses for detecting a contention on a bus and initiating a remedial action in the event a contention is detected.

4,929,941

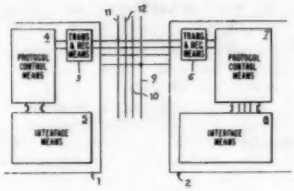
DEVICE FOR TRANSMITTING ITEMS OF INFORMATION FOR AN AUTOMOBILE VEHICLE AND A METHOD OF USING SAID DEVICE

Jean-Luc Lecocq, Sevres, France, assignor to Automobiles Peugeot, Paris; Automobiles Citroen, Neuilly Sur Seine and Regie Nationale des Usines Renault, Boulogne Billancourt, all of, France

Filed Nov. 21, 1988, Ser. No. 274,311
Claims priority, application France, Nov. 25, 1987, 87 16367
Int. Cl.[5] H04B *14/00*; H04L *7/00*
U.S. Cl. 340—825.14 **6 Claims**

1. A device for a differential transmission of items of infor-

mation between at least two elements of an automobile vehicle, each of which elements comprises: information transmitting means and information receiving means and two information transmission lines interconnecting said information transmitting means and information receiving means, means for processing signals circulating on the information transmission lines, wherein the processing means comprise means for establishing a derivative of the signals travelling on the information transmission lines and means for shaping output signals of said derivative-establishing means provided in the information



receiving means, wherein the receiving means comprise means for generating a bias voltage connected to the derivative-establishing means, wherein the means for shaping comprises a comparator having a small offset and a centered hysteresis relative to the output from the means for generating a bias voltage whereby the transmission of items of information may occur with a normal differential mode by a transmission on two lines or in a degraded mode on a single line by determining the derivative of the signals in this line and putting the output signals of the derivative-establishing means back into shape.

4,929,942

LIGHTING PEG

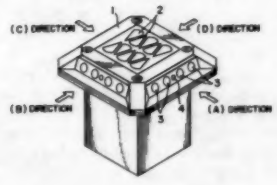
Kikuo Niimi, Aichi, Japan, assignor to Kictec Incorporation, Aichi, Japan

Filed Dec. 9, 1988, Ser. No. 282,435

Claims priority, application Japan, Apr. 11, 1988, 63-47741[U]

Int. Cl.[5] **E01F** *9/00*; **G08G** *1/00*; **B60Q** *7/00*

U.S. Cl. 340—908.1 **7 Claims**



1. A lighting peg comprising:

an outer casing;

a solar cell provided on an upper surface of said casing;

a battery installed in said casing and connected in series with said solar cell;

a photoelectric conversion element provided on a side surface of said casing and connected in series with a variable resistor;

a differential circuit connected to an output side of said photoelectric conversion element;

a comparator comparing the output of said differential circuit with a reference voltage;

a multivibrator which generates output pulses when the output of said comparator is high level;

a counter which starts counting said pulses generated from said multivibrator when the output of said comparator becomes low level, and stops operation of said multivibrator when the counter counts a predetermined number of pulses; and

a plurality of light emitting elements provided on the side surface of said casing to be operable in a pulsating manner when said multivibrator is operated.

4,929,943

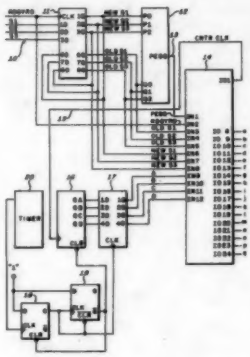
MARINE COMPASS RATE-OF-TURN INDICATOR

Chris J. Baldwin, Earlysville, Va., assignor to Sperry Marine, Inc.

Filed Jul. 1, 1988, Ser. No. 214,704

Int. Cl.[5] **G08B** *23/00*

U.S. Cl. 340—984 **7 Claims**



1. Rate-of-turn indicator apparatus for use with a marine compass that provides heading data in incremental coded sequence format, comprising:

detecting means coupled to said marine compass for detecting increments of change of said heading data and for providing increment of change representative signals,

counting means responsive to said increment of change representative signals for counting said increments of change over a predetermined time interval, thereby providing a rate-of-turn count signal,

first logic means responsive to said coded sequence heading data for generating a signal representative of direction of turn,

a plurality of discrete visual indicator means responsive to said rate-of-turn count signal for providing visual indications of discrete increments of rate-of-turn, and responsive to said signal respresentative of direction of turn for providing a visual indication of said direction of turn, and

second logic means responsive to said count signal for activating and indicator means in accordance with said count signal so as to provide a discrete indication of said discrete increments of said rate-of-turn.

4,929,944

KEY INPUT APPARATUS

Akira Nakajima, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jun. 16, 1988, Ser. No. 207,426

Claims priority, application Japan, Jun. 16, 1987, 62-150493

Int. Cl.[5] **H04B** *15/00*

U.S. Cl. 341—24 **3 Claims**

1. An input key apparatus comprising:

a keyboard including a plurality of keys and generating key signals when keys are pressed;

a key input decoder receiving the key signals from the keyboard for generating decoded key signals, the key input decoder generating a single key depression signal when a

key of the keyboard is pressed one time, and a multi-key depression signal when two or more keys of the keyboard are simultaneously pressed;

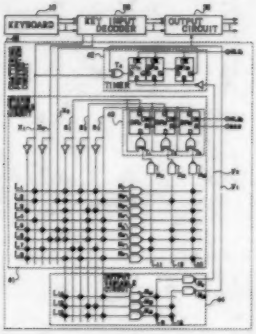
a chattering prevention circuit receiving the single key depression signal and the multi-key depression signal for determining on the basis of the received signals whether or not the key signal received by the decoder is valid, for the purpose of generating a key input valid signal; and

an output circuit receiving the decoded key signal for latching the decoded key signal in response to the key input valid signal;

wherein the chattering prevention circuit includes;

a timer starting its operation in response to a timer start signal for generating a timer out signal after a predetermined time;

a status variable circuit which assumes any one of first to fifth status on the basis of the single key depression signal and the multi-key depression signal from the decoder and the timer out signal from the timer, the status variable circuit outputting status information indicative of which status the status variable circuit is in, the status variable circuit being put in a first status when the apparatus is powered on, the status variable circuit operating to shift from the first status to a second status if the single key depression signal is made active when it is in the first status, the status variable circuit also operating to return to



the first status if the single key depression signal is made inactive before the timer out signal is made active, but to shift to a third status if the timer out signal is made active while the single key depression signal is maintained in the active condition, the status variable circuit also operating to shift to a fourth status if the single key depression signal is made inactive after the circuit is in the third status, the status variable circuit also operating to return to the third status if the single key depression signal is made active before the timer out signal is made active and after the circuit has been put in the fourth status, but to respond to a variation of the multi-key depression signal, the status variable circuit also operating to shift to the first status if both of the single key depression signal and the multi-key depression signal are made inactive after the active timer out signal is outputted, but to shift to a fifth status if the single key depression signal is made inactive but the multi-key depression signal is active after the active timer out signal is outputted, the status variable circuit also operating to maintain the fifth status until both of the single key depression signal and the multi-key depression signal are made inactive after the circuit has been put in the fifth status, and to thereafter shift to the first status; and

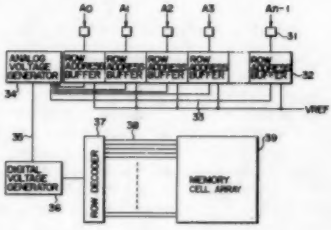
an output variable circuit in response to the status information from the status variable circuit to selectively activate the key in put valid signal so as to allow the output circuit to latch the output of the decoder only when the second status is changed to the third status whereby an error operation which would be caused at a rising edge of the key signal is prevented, the output variable circuit also operating to control the status variable circuit so as to return the status variable circuit to the first or fifth status after it is put in the fourth status and only when both of the single key depression signal and the multi-key depression signal are made inactive after the predetermined time, so that an error operation which would be caused at a falling edge of the key signal is prevented.

4,929,945

SEMICONDUCTOR MEMORY DEVICE HAVING A SMALL NUMBER OF SIGNAL LINES

Natsuki Kushiyama, Yokosuka, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 21, 1988, Ser. No. 171,104
Claims priority, application Japan, Mar. 31, 1987, 62-78610
Int. Cl.[5] H03M *1/00*
U.S. Cl. 341—50 **10 Claims**



1. A semiconductor memory device, comprising:

a buffer for receiving and outputting a first digital signal;

a digital-to-analog converter for receiving said first digital signal output from said buffer, converting the first digital signal into an analog signal, and outputting the analog signal;

an analog-to-digital converter for receiving said analog signal output from said digital-to-analog converter, converting the analog signal into a second digital signal, and outputting the second digital signal;

a decoder for receiving said second digital signal output from said analog-to-digital converter, and decoding the second digital signal;

at least two digital signal lines for transferring said first digital signal output from said buffer to said digital-to-analog converter; and

at least one analog signal line for transferring said analog signal output from said digital-to-analog converter to said analog-to-digital converter.

4,929,946

ADAPTIVE DATA COMPRESSION APPARATUS INCLUDING RUN LENGTH ENCODING FOR A TAPE DRIVE SYSTEM

John T. O'Brien, Lafayette; Neil L. Thomas, Boulder, and Tracy D. Dyer, Aurora, all of Colo., assignors to Storage Technology Corporation, Louisville, Colo.

Filed Feb. 9, 1989, Ser. No. 308,767
Int. Cl.[5] H03M *7/48*
U.S. Cl. 341—87 **17 Claims**

1. A data compression apparatus for efficiently compressing a user block data into a bit compressed data block for storage on a data storage medium comprising:

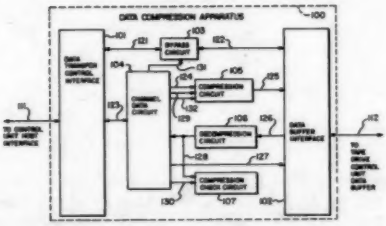
means for dividing said user data block into a plurality of equal sized segments of data;

means for compressing each of said segments of data inde-

pendent of all other segments of data in said user data block comprising:

means responsive to a received user data byte in one of said segments of data for determining whether said received user data byte is identical to the n previous data bytes, the last byte of a string or a single user data byte in said one segment of data;

means responsive to said determining means for assigning one of a plurality of run length reference values to a user data byte that is identical to at least the n previous user data bytes, where n is an integer >2;



means responsive to said determining means for assigning one of a plurality of byte compression reference values to a user data byte;

means responsive to said determining means for assigning one of a plurality of string compression reference values to a user data byte that comprises the last byte of a data string; and

means for writing each of said reference values successively received from said compressing means on to a data storage medium to form said bit compressed data block.

4,929,947

CONSTANT WIDTH PULSE DISTRIBUTION IN A DIGITAL TO ANALOG CONVERTER FOR SERIAL DIGITAL DATA

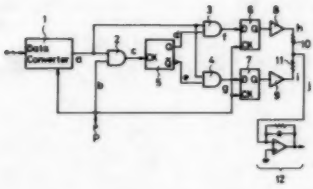
Akira Toyama, Tokyo, Japan, assignor to Nippon Precision Circuits Ltd., Japan

Filed Apr. 4, 1988, Ser. No. 176,921

Claims priority, application Japan, Apr. 2, 1987, 62-81644

Int. Cl.[5] H03M 1/66

U.S. Cl. 341—146 **4 Claims**



1. A digital to analog converting circuit for converting serial digital data into analog signal output, comprising:

distributing means receptive of serial bit data pulses supplied sequentially for distributing the data pulses to at least two parallel channels, each distributed pulse of each channel having a constant width and a constant time interval between a termination of one pulse and a beginning of the next pulse in each channel;

converting means disposed in each channel for converting each pulse having said constant width into an analog value; and

adding means for adding the analog values of said each channel and producing an analog signal output corresponding thereto.

4,929,948

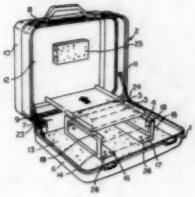
PORTABLE DATA SYSTEM

Göran I. Holmberg, Boca Raton, Fla., assignor to Basics Corporation, Boca Raton, Fla.

Filed Mar. 9, 1989, Ser. No. 321,241

Int. Cl.[5] G08B 1/00; G06F 1/00

U.S. Cl. 340—407 **2 Claims**



1. A transportable data system comprising at least two mutually cooperating units (3, 4), for instance a personal computer and a printer, said system being fitted in a rigid case which includes a lid (2) and a bottom part (1) and, in which system when the case is closed the one unit (3), which is supported by a displaceable carrier plate (5), is located above the other (4) of said units, and when the case is open, with the lid (2) substantially vertical, can be displaced towards and partially into the lid so as to expose the said other unit (4) so that said other unit will come into a working position, characterised in that firmly attached to the bottom part of the case (1) are two separate side-wall elements (14, 15) each of which has an upper guide rail (18, 19, 20) which is parallel with said bottom part, said guide rails being parallel with each other, and in that the carrier plate (5) is displaceably mounted on the guide rails 18, 19, 20 with the aid of guide means (21, 22).

4,929,949

RADIO CONTROL TRANSMITTER HAVING IMPROVED DISPLAY CHARACTERISTICS

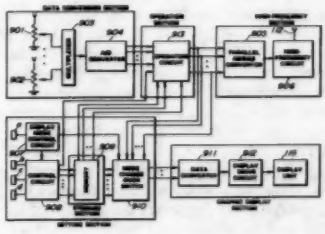
Michio Yamamoto, and Satoshi Sekiya, both of Mobara, Japan, assignors to Futaba Denshi Kogyo K.K., Mobara, Japan

Filed Apr. 22, 1988, Ser. No. 184,670

Claims priority, application Japan, Apr. 24, 1987, 62-099933

Int. Cl.[5] H04Q 9/14

U.S. Cl. 341—176 **6 Claims**



1. A radio control transmitter comprising:

a data conversion section for generating digital output signals responsive to the operation of control sticks;

a setting section for setting a trimming operation of said control sticks for adjusting said output from said control sticks and for generating output signals;

an operation section for processing the output signals of said data conversion section and setting section to generate output signals;

a high-frequency section for modulating the output signal of said operation section into a high-frequency signal in the form of a predetermined shape and generating said signal; and

a graphic display section of displaying control characteristics of said control sticks with respect to a controlled object responsive to the output signal of said operation section.

4,929,950

SYNTHETIC APERTURE RADAR SYSTEMS

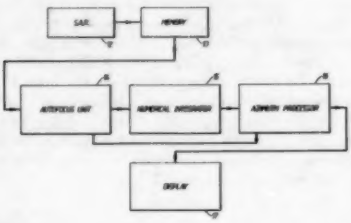
Anthony Freeman, La Crescenta, Calif.; David Blacknell; Shaun Quegan, both of Sheffield, England; Ian A. Ward, Chelmsford, England; Christopher J. Oliver, Malvern, England; Ian P. Finley, St. Johns, England; Richard G. White, Malvern, England, and James W. Wood, Malvern Link, England, assignors to The General Electric Company, plc and The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, both of London, United Kingdom

Continuation of Ser. No. 79,966, Jul. 31, 1987, abandoned. This application Jan. 5, 1989, Ser. No. 293,599

Claims priority, application United Kingdom, Dec. 18, 1986, 8630315

Int. Cl.[5] G01S *13/90*

U.S. Cl. 342—25 **3 Claims**



1. In a synthetic aperture radar system having a moving antenna for transmitting radar signals into a region containing a number of objects of interest and receiving a reflected signal from each of said number of objects, and an azimuth processor means for azimuth processing said received reflected signals to calculate relative positions of said number of objects; the improvement comprising

means for determining distortions, caused by deviations of the moving antenna from a straight line trajectory, in each of said reflected signals and for supplying signals for correcting said distortions to said azimuth processing means, said distortion determining means including:

an autofocus unit for determining the slope of a linear approximation of the frequency modulation of the received signals with respect to position, and for providing a first output signal corresponding to said slope,

an integrator means, to whose input is fed a said first output signal of said autofocus unit, for integrating said first output signal to determine the intercept of the linear approximation of the frequency modulation of the received signals, and for providing a second output signal corresponding to said intercept; and

means for supplying said first and second output signals to said azimuth processor means whereby the azimuth processing is carried out in said azimuth process or means using the thus determined slope and intercept of the linear approximation of the frequency modulation of the received signals.

4,929,951

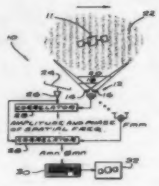
APPARATUS AND METHOD FOR TRANSFORM SPACE SCANNING IMAGING

James G. Small, Westlake Village, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 23, 1988, Ser. No. 289,275

Int. Cl.[5] G01S *13/89*

U.S. Cl. 342—179 **26 Claims**



1. Apparatus for transform space scanning imaging, comprising:

means for illuminating a target with wave energy selected from the group consisting of acoustic and electromagnetic radiation said wave energy capable of producing an interference pattern, said means comprising at least one pair of spaced apart sources of said wave energy, said pair comprising a first source emitting said wave energy having a first frequency, and a second source emitting said wave energy at a second frequency, said first and second sources producing overlapping fields of illumination for producing at least one interference pattern;

receiver means for receiving said wave energy reflected from said target, and producing first signals indicative of the amplitude and phase of said reflected illumination;

signal processing means responsive to said first signals for determining spatial frequencies of said reflected illumination received from said target, and for producing signals representative of a two dimensional spatial frequency map of said target; and

image forming means responsive to said second signals for producing a two dimensional image of said target.

4,929,952

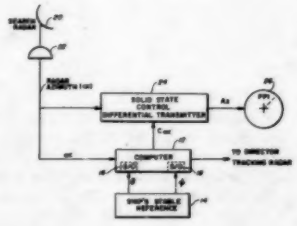
SEARCH-RADAR AZIMUTH CORRECTION

Alan M. Schneider, La Jolla, and Donald W. Doherty, San Diego, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Continuation of Ser. No. 619,248, Jun. 11, 1984, abandoned. This application Oct. 10, 1989, Ser. No. 420,623

Int. Cl.[5] H01Q *3/02*

U.S. Cl. 342—184 **8 Claims**



1. In a radar system having a radar antenna mounted on a non-stable platform and a radar polar coordinate plan position indicator display, said radar antenna mounted on a non-stable platform being mounted on a craft or vehicle that is subject to

motion and that has a stable reference source that is stable in attitude, the improvement comprising a correction system for generating a correction-to-azimuth signal, $C\alpha$, said correction system comprising:

a computer having a first input connected to said stable reference source, having a second input connected to said radar antenna, and having at least a first output;

means having a first input connected to said antenna and a second input connected to said first computer output for generating an output signal that comprises said correction-to-azimuth signal, $C\alpha$, said means having an output that is connected to said radar display; and further wherein:

said radar antenna is not mounted on a platform that moves independently with respect to the motion of said craft or vehicle and wherein said non-stable platform does not move independently with respect to the motion of said craft or vehicle; and

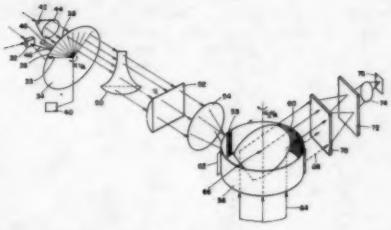
wherein said correction-to-azimuth signal, C_α, is the correction angle which must be added to the antenna radar azimuth angle, α, to obtain the true value of the azimuth of the target in the horizontal plane relative to the projection of the longitudinal axis of said craft or vehicle in the horizontal plane.

4,929,953

METHOD AND APPARATUS FOR CONTINUOUS ON LINE RECORDING AND PROCESSING OF SYNTHETIC APERTURE RADAR SIGNALS IN REAL TIME

Robert W. Brandstetter, Levittown, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Dec. 28, 1988, Ser. No. 291,008
Int. Cl.[5] G01S 9/42
U.S. Cl. 342—190 **36 Claims**



1. A real time SAR recording and processing system comprising:

a first movable recording medium being successively movable through a write zone and a read zone, said first movable recording medium being comprised of reusable material;

means for recording SAR data on said first movable recording medium as said recording medium passes through said write zone;

means for processing said SAR data as said first movable recording medium passes through said read zone to produce an SAR image in real time; and

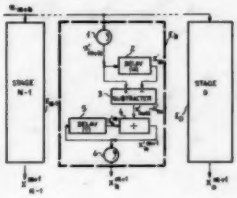
means for continuously moving said first movable recording medium through said write and read zones to continuously record and process new SAR data on said first movable recording medium on an area of said first movable recording medium on which SAR data has been previously recorded and processed.

4,929,954

DEVICE FOR COMPUTING A SLIDING AND NONRECURSIVE DISCRETE FOURIER TRANSFORM AND ITS APPLICATION TO A RADAR SYSTEM

Philippe Elleaume, Antony, France, assignor to Thomson-CSF, Paris, France

Filed Sep. 23, 1986, Ser. No. 910,578
Claims priority, application France, Sep. 24, 1985, 85 14136
The portion of the term of this patent subsequent to Sep. 20, 2005, has been disclaimed.
Int. Cl.[5] G01S 7/44
U.S. Cl. 342—194 **7 Claims**



1. A device for computing a sliding discrete Fourier transform in a time window of duration T for producing an output representing at least one component (X_k^{m+1}) of said transform from N samples (x_{m+N}) of an input signal whose transform is to be computed, wherein said computing device has at least one stage (E_k) for receiving samples and comprising complex rotation operator means as well as adding and/or subtracting means and delay circuits for delivering said component (X_k^{m+1}) defined by

$$X_k^{m+1}=X'_k{}^{m+1}\cdot\exp\{j2\pi\cdot(m+1\cdot k/N)\} \quad (1)$$

with

$$X'_k{}^{m+1}=X'_k{}^{m}+x'_{m+N}-x'_m \quad (2)$$

$$x'_m=x_{m+N}\cdot\exp\{-j2\pi\cdot(m\cdot k/N)\} \quad (3)$$

where k is the stage index and m is the window index.

4,929,955

CIRCULAR WAVEGUIDE AMPLITUDE COMMUTATOR

Thomas O. Miles, Madeira Beach, and Carl E. Kreitzer, St. Petersburg, both of Fla., assignors to E-Systems, Inc., Dallas, Tex.

Filed Mar. 7, 1988, Ser. No. 165,002
Int. Cl.[5] H01Q 3/26; H01P 5/12
U.S. Cl. 342—371 **9 Claims**

9. A microwave signal amplitude commutator for an R.F. receiver, said commutator receiving at N ports a cosine-squared-on-a-pedestal amplitude distribution signal from N elements of a circular or cylindrical phased antenna forming a low sidelobe antenna array, said commutator comprising:

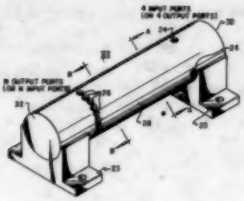
a circular waveguide section having N ports at one end for receiving said signal from the N corresponding elements of the antenna array for exciting a TM_{01} mode signal and spatially orthogonal TE_{11} mode signals in selected quadrants of the waveguide, four quadrature ports at the other end and both ends short circuited,

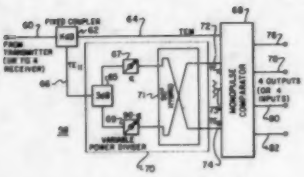
means coupled to said quadrature ports for commutating a signal amplitude distribution comprising of the TM_{01} mode signal and spatially orthogonal TE_{11} mode signals in the waveguide,

means coupled to the commutating means for recovering the TM_{01} mode signal and the spatially orthogonal TE_{11} mode signals at the four quadrature ports,

means coupled to the signal recovering means for separating

the signals at the quadrature ports into TEM and spatially orthogonal TE_{11} signals, and





means coupled to the separating means for receiving the separated TEM and spatially orthogonal TE_{11} signals and generating a composite TEM signal for transfer to the receiver.

4,929,956

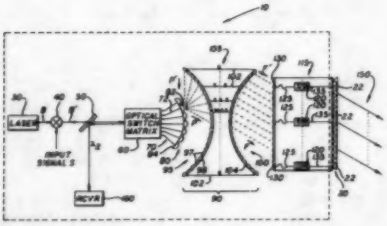
OPTICAL BEAM FORMER FOR HIGH FREQUENCY ANTENNA ARRAYS

Jar J. Lee, Irvine, and Huan-Wun Yen, Westlake, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Sep. 10, 1988, Ser. No. 246,394

Int. Cl.[5] H01Q *3/00*

U.S. Cl. 342—376 **18 Claims**



1. A transmit antenna beamforming network comprising:

means for generating a beam of optical energy;

modulating means for modulating said beam of optical energy in response to an input signal modulated about a first frequency;

radiating means for generating a first electromagnetic field pattern by radiating said modulated beam in a first direction;

constrained lens means including a first array of radiating elements for receiving said first field pattern and a second array of radiating elements for emitting an antenna driver feed beam in a second direction in response thereto;

antenna array driving means electromagnetically coupled to said constrained lens means by said feed beam for providing a set of signals modulated about said first frequency; and

antenna array means for radiating an electromagnetic scan beam modulated about said first frequency substantially in said second direction in response to said set of signals.

4,929,957

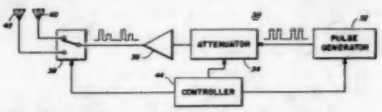
METHOD AND APPARATUS FOR DETECTING RECEIVER COMPRESSION IN MULTIPLE LOBE GUIDANCE SYSTEMS

Charles W. Davidson, Renton, Wash., assignor to Sundstrand Data Control, Inc., Redmond, Wash.

Filed Jul. 17, 1989, Ser. No. 380,912

Int. Cl.[5] G01S *1/16, 1/18*

U.S. Cl. 342—410 **6 Claims**



1. A multiple beam guidance system comprising:

means for transmitting a plurality of pulses on each of a plurality of overlapping directional beams, with the pulses transmitted on each beam having two different amplitudes with a predetermined amplitude differential therebetween; and

means for receiving pulses from said plurality of beams and comparing the amplitudes of pulses from different beams to provide a guidance signal, said receiving and comparing means including means for comparing the amplitudes of pulses received from an individual beam and generating a compression indication if the difference therebetween is not substantially equal to the predetermined amplitude differential between the amplitudes of the transmited pulses.

4,929,958

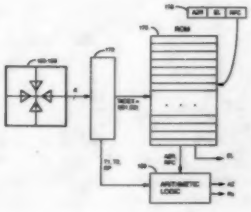
HIGH PRECISION RADAR DETECTION SYSTEM AND METHOD

P. Lloyd Hodel, Redwood City, and Paul V. Atkins, Pacifica, both of Calif., assignors to Dalmo Victor, Inc., Belmont, Calif.

Filed Jul. 26, 1989, Ser. No. 386,417

Int. Cl.[5] G01S *3/80*

U.S. Cl. 342—432 **8 Claims**



1. A radar detection system, comprising:

a set of four transducer means for receiving signals indicative of the location of an object;

sorting means coupled to said set of transducer means for selecting the first, second and third strongest of said received signals and for generating therefrom first and second differential signals, said first differential signal corresponding to the difference between the strongest and second strongest of said received signals and said second differential signal corresponding to the difference between the second strongest and third strongest of said received signals;

table means for storing at least one angular value corre-

sponding to each of a predefined set of pairs of said two differential signals; and

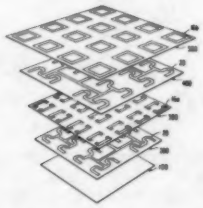
lookup means coupled to said sorting means and said table means for retrieving from said table means an angular value corresponding to the differential signal values generated by said sorting means.

4,929,959

DUAL-POLARIZED PRINTED CIRCUIT ANTENNA HAVING ITS ELEMENTS CAPACITIVELY COUPLED TO FEEDLINES

Robert M. Sorbello, Potomac; John E. Effland, Gaithersburg, and Amir I. Zaghloul, Bethesda, all of Md., assignors to Communications Satellite Corporation, Washington, D.C.

Filed Mar. 8, 1988, Ser. No. 165,332
Int. Cl.[5] H01Q *00/00*
U.S. Cl. 343—700 MS **20 Claims**



1. A dual-polarized printed circuit antenna comprising:

a ground plane;

a first power divider array disposed over said ground plane;

a first array of radiating elements disposed over said first power divider array;

a second power divider array disposed over said first array of radiating elements; and

a second array of radiating elements disposed over said second power divider array;

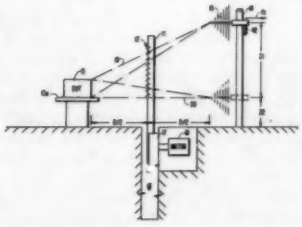
wherein said first power divider array and said first array of radiating elements are capacitively coupled to each other, and said second power divider array and second array of radiating elements are capactively coupled to each other.

4,929,960

PEAK RADIATED ENERGY LOCATOR

William R. Kaylor, Morristown, and Frederick A. Fisher, Jefferson City, both of Tenn., assignors to North American Philips Corporation, New York, N.Y.

Filed Mar. 14, 1989, Ser. No. 323,474
Int. Cl.[5] G01R *23/18*
U.S. Cl. 343—703 **14 Claims**



1. A peak radiated energy locator of the type including a turn table for mounting a device from which radiated energy is to be detected and a vertically positionable antenna for receiving radiated energy from the device comprising:

a mast removably positioned between said antenna and said device;

a plurality of broadband antennas positioned in vertical alignment on said mast;

means coupled to said plurality of broadband antennas for determining a vertical angle at which peak radiated energy from said device is detected and providing signals representative of said vertical angle; and

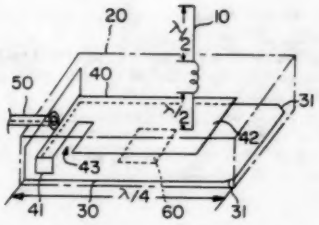
means responsive to said vertical angle representative signals for vertically locating said vertically positionable antenna at a height determined from said vertical angle.

4,929,961

NON-GROUNDED TYPE ULTRAHIGH FREQUENCY ANTENNA

Kazuhiko Nakase, Tokyo, Japan, assignor to Harada Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 24, 1989, Ser. No. 342,181
Int. Cl.[5] H01Q *1/32, 9/38*
U.S. Cl. 343—715 **4 Claims**



1. A non-grounded type ultrahigh frequency antenna characterized in that said antenna comprises:

an antenna element having a length substantially equal to λ/2 at a working frequency;

a casing provided at the base of said antenna element;

a metal section which is a part of said casing, said metal section having a length of approximately λ/4 at said working frequency;

a first metal plate provided in said casing, one end of said metal plate being grounded and another end being coupled to said antenna element, said first metal plate further being provided above said metal section and parallel thereto; and

a second metal plate provided between said antenna element and said first metal plate, said second metal plate being provided above said first metal plate and parallel thereto;

wherein a constant K-filter is formed by an electrostatic capacitance between said first and second metal plates and a residual inductance of said antenna element, and said antenna is made parallel-resonant within said working frequency by said electrostatic capacitance created between said first metal and said second metal plate and an inductance of said first metal plate.

4,929,962

FEED HORN FOR A TELECOMMUNICATIONS ANTENNA

Eric Bégout, Nogent Sur Marne; Alain Bourgeois, Eaubonne; Raymond Gueuret, Nanterre, and Pascal Lapeyre, Ermont, all of France, assignors to Societe Anonyme dite: Alcatel Thomson Faisceaux Hertiziens, Levallois Perret Cedex, France

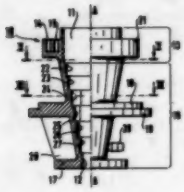
Filed Dec. 9, 1987, Ser. No. 130,593
Claims priority, application France, Dec. 9, 1986, 86 17210
Int. Cl.[5] H01Q *13/00*
U.S. Cl. 343—786 **13 Claims**

1. A feed horn for a telecommunications antenna, said feed

horn being fabricated from a moldable material, said feed horn comprising:

a radiating portion having a circular aperture, said radiating portion being formed by an annular flange provided with a least two concentric grooves forming two traps, said grooves having open ends which are substantially coplanar;

a transition having first and second ends and formed by waveguide sections of progressively varying cross-section, said transition being coupled at said first end to said radiating portion;



a flange surrounding said second end of said transition and which provides a coupling with a rectangular waveguide; and

fixing means for fixing said feed horn in a support, said fixing means comprising two concentric cylindrical flanges having different diameters and located in the external central portion of said horn.

4,929,963

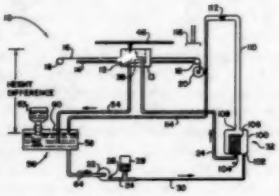
INK DELIVERY SYSTEM FOR INKJET PRINTER

Leonard Balazar, San Diego, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Sep. 2, 1988, Ser. No. 240,786

Int. Cl.[5] G01D *15/16*; B41J *3/04*

U.S. Cl. 346—1.1 **16 Claims**



15. A process for supplying ink to an ink jet printer, comprising the steps of:

supplying an ink jet print head, from which droplets of ink may be ejected, the ink jet print head having an ink flow channel therethrough;

pumping ink through the ink flow channel of the print head to provide ink for ejection and to cool the print head, as the print head operates during printing, at a flow rate greater than required to supply the printing requirements of the print head, while maintaining the pressure of the ink in the ink flow channel of the ink jet print head below atmospheric pressure; and

withdrawing a portion of the ink flowing through the ink flow channel for ejection from the print head.

4,929,964

METHOD FOR PREPARING LIQUID JET RECORDING HEAD, LIQUID JET RECORDING HEAD PREPARED BY SAID METHOD AND LIQUID JET RECORDING DEVICE HAVING SAID LIQUID JET RECORDING HEAD MOUNTED THEREON

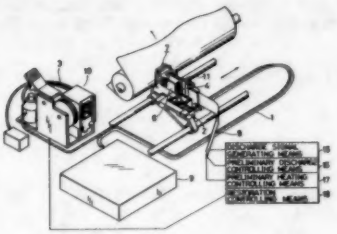
Koichi Sato, Yokohama, and Masami Ikeda, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 7, 1989, Ser. No. 363,524

Claims priority, application Japan, Jun. 7, 1988, 63-138418

Int. Cl.[5] G01D *15/16*; B41J *3/04*

U.S. Cl. 346—1.1 **33 Claims**



1. A method for preparing a liquid jet recording head, comprising the steps of:

providing a liquid jet recording head having an electro-thermal energy convertor for generating heat energy for discharging ink by applying electrical signals to said electro-thermal convertor, said electro-thermal energy convertor comprising a heat-generating resistor and a pair of electrodes for applying electrical signals to said heat-generating resistor; and

aging said heat-generating resistor by applying to said electrodes electrical signals sufficient to stabilize the resistance value of said heat-generating resistor by heat treating said heat-generating resistor through heat generation therein.

4,929,965

OPTICAL WRITING HEAD

Masashi Fuse, Morioka, Japan, assignor to Alps Electric Co., Japan

Filed Aug. 4, 1988, Ser. No. 228,886

Claims priority, application Japan, Sep. 2, 1987, 62-220007; Sep. 2, 1987, 62-220008; Nov. 7, 1987, 62-281342; Nov. 7, 1987, 62-281343; Nov. 7, 1987, 62-281344; Nov. 7, 1987, 62-281345

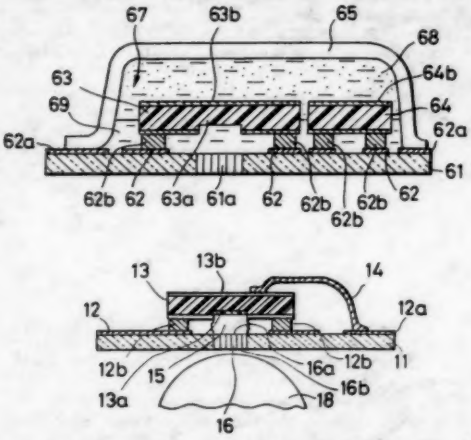
Int. Cl.[5] G01D *9/42*; G02B *6/08*; H01L *23/28*

U.S. Cl. 346—107 R **6 Claims**

1. An optical writing head, comprising a light emitting means, and a substrate on which said light emitting means is mounted, said substrate having a light transmitting property at a portion thereof which opposes to said light emitting means, whereby light emitted from said light emitting means is taken out through said substrate so that it may be irradiated upon a light receiving body, wherein said light emitting means is covered with a cover, and wherein a filler is filled up between said light emitting means and said cover.

5. An optical writing head, comprising a light emitting means, a substrate on which said light emitting means is mounted, said substrate having a fiber bundle composed of a plurality of optical fibers positioned in at least a portion thereof which opposes to said light emitting means, whereby light emitted from said light emitting means is incident to one end of

said fiber bundle and emitted out the other end of said fiber bundle, and wherein a transparent resin having a high refractivity is positioned between said light emitting means and said one end of said fiber bundle.



4,929,966

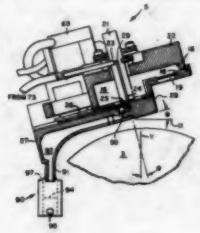
CONTINUOUS INK JET PRINTER WITH A GRAVITY DRAIN, CATCHER RETURN SYSTEM

Gregory J. Sexton, Dayton, and Gregory M. Kopp, Huber Heights, both of Ohio, assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 3, 1989, Ser. No. 292,846

Int. Cl.[5] G01D *15/18*

U.S. Cl. 346—75 **3 Claims**



3. In continuous ink jet printer apparatus of the kind having a print head assembly including generator means for directing droplet streams toward a print zone, and catcher means laterally offset from the droplet stream print path and droplet charge means for selectively effecting charge deflection of non-print drops from the droplet stream print path to said catcher means the improvement wherein:

(a) said generator means is mounted so that, in the nominal operating orientation of said printer, said droplet stream print path is offset from vertical in the range of 50° to 20° in the direction toward said catch means; and

(b) said catcher means includes a surface generally parallel to said droplet print path and an ink return passage located at the bottom of said surface and generally normal to said droplet print path whereby ink intercepted by said catcher means flows by gravity from said catcher.

4,929,967

EXPOSURE DEVICE USING CRT AS EXPOSURE LIGHT SOURCE

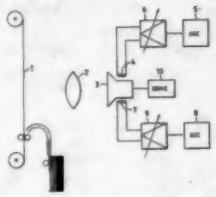
Yoshimasa Hara, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha

Filed Apr. 14, 1989, Ser. No. 337,855

Claims priority, application Japan, Apr. 14, 1988, 63-49403[U]

Int. Cl.[5] G01D *9/42, 15/14*

U.S. Cl. 346—110 R **4 Claims**



1. An exposure device for exposing a photosensitive recording medium to light to record an image thereon, comprising:

a cathode ray tube for displaying an image on a display screen, said cathode ray tube comprising an electron gun for emitting an electron beam, a horizontal deflection means for horizontally deflecting said electron beam, and a vertical deflection means for vertically deflecting said electron beam;

a horizontal deflection angle changing means for changing the horizontal deflection of said electron beam to change a horizontal length of said image displayed on said display screen;

a vertical deflection angle changing means for changing the vertical deflection of said electron beam to change a vertical length of said image displayed o said display screen: and

wherein said photosensitive recording medium is disposed to face said display screen to be exposed to an image bearing light emanated from said display screen, whereby the size of the image recorded on said photosensitive recording medium can be changed by changing the size of the image displayed on the display screen.

4,929,968

PRINTING HEAD ASSEMBLY

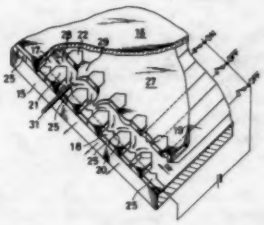
Takatoshi Ishikawa, Furukawa, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan

Filed Aug. 28, 1989, Ser. No. 399,657

Claims priority, application Japan, Aug. 29, 1988, 63-112956[U]

Int. Cl.[5] G01D *15/16;* **B41J** *3/04*

U.S. Cl. 346—140 R **4 Claims**



4. An ink jet printer comprising:

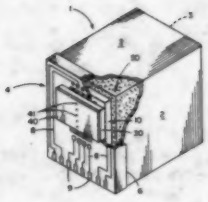
an insulative substrate having a top surface;
an electrically conductive first electrode provided on the top surface;
a plurality of spaced apart second electrodes provided on the top surface, each of the second electrodes being spaced apart from the first electrode so as to define an electrical field gap between the respective second electrode and the first electrode;
ink chamber defining means for containing a body of ink in an ink chamber area of the top surface;
nozzle defining means for defining one or more ink jet nozzles in a nozzle area of the top surface; and
air chamber defining means for defining an air chamber area of the top surface interposed between the nozzle area and the ink chamber area.

4,929,969

INK SUPPLY CONSTRUCTION AND PRINTING METHOD FOR DROP-ON-DEMAND INK JET PRINTING

Brian G. Morris, Dayton, Ohio, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 25, 1989, Ser. No. 398,580
Int. Cl.[5] B41J *2/175*
U.S. Cl. 346—140 R **36 Claims**



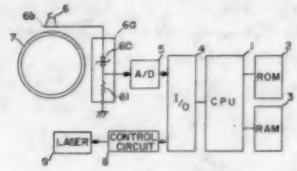
1. In a drop-on-demand, ink jet system of the kind having a print head component including orifices, drop ejection transducers and passage means for supplying ink to drop ejection regions proximate said transducers, an improved ink supply reservoir comprising:
(a) a housing defining an ink storage volume and having a vent opening and an ink outlet connected to said passage means;
(b) a mass of foam material occupying a major portion of said housing and covering said ink outlet, said foam comprising three dimensionally branched network of fine filaments interconnected so as to form a large void volume composed of uniform size interstitial pores.

4,929,970

LASER PRINTER

Koichi Inui, Higashiosaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Dec. 21, 1988, Ser. No. 287,886
Claims priority, application Japan, Dec. 21, 1987, 62-324801
Int. Cl.[5] G01D *15/00*
U.S. Cl. 346—160 **3 Claims**



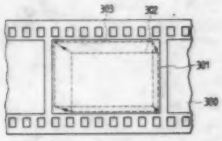
1. In a laser printer comprising a photoreceptive means, and a laser beam emitting device, said laser printer further comprises a compensation means for compensating the degradation of the image quality originating in said photoreceptive means, said compensation means comprising: a detecting means for detecting a factor of the degradation of the image quality; and a control means which controls the output level of said laser beam emitting device in accordance with the detected level of said factor.

4,929,971

CAMERA AND IMAGE OUTPUT APPARATUS CAPABLE OF TRIMMED PHOTOGRAPHING

Yoshio Imura, Machida, and Tsugio Takahashi, Tokyo, both of Japan, assignors to Nikon Corporation, Tokyo, Japan

Filed Jun. 1, 1989, Ser. No. 360,245
Claims priority, application Japan, Jun. 3, 1988, 63-136754
Int. Cl.[5] G03B *17/24*
U.S. Cl. 354—75 **10 Claims**



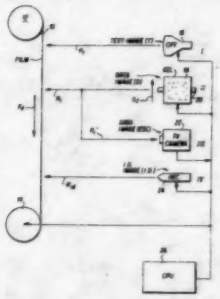
1. A camera in which the optical axis of a photographing lens is positioned different from that of a view finder and to which detachably mounted is record means capable of recording therein an image to be photographed, comprising:
(a) means for producing an object distance signal according to the object distance;
(b) information producing means for producing parallax information corresponding to the difference between the photographing field of the photographing lens and the viewing field of the view finder, based on said object distance signal; and
(c) writing means for recording said parallax information on said record means in response to said producing means.

4,929,972

METHOD AND APPARATUS FOR ELECTRONIC AND PHOTOGRAPHIC IMAGE RECORDING

Norman G. Anderson, Rockville, Md., and Norman L. Anderson, Washington, D.C., assignors to Large Scale Biology, Rockville, Md.

Filed May 15, 1987, Ser. No. 49,982
Int. Cl.[5] G03B *29/00*
U.S. Cl. 354—75 26 Claims



1. An apparatus for photographically and electronically acquiring, recording and storing a data image, and information in the form of a text image and an identification image, each associated with said data image, on photographic film and electronic media, comprising:

means for photographing the data image on film;

means for generating and displaying the text image representing information associated with the data image from stored data in response to a call for the text image;

means for photographing the text image onto the film in association with the data image;

means for generating the identification image associated with the data image from stored data in response to a call for said identification image;

means for recording the identification image onto the photographic film in association with said data image and text image;

means for electronically acquiring the data image and retrievably transferring the data image to storage in association with the stored data called for generating the text image and the identification image.

4,929,973

PANHEAD WITH QUICK RELEASE SHOE

Kouichiro Nakatani, Tokyo, Japan, assignor to Velbon International Corporation, Torrance, Calif.

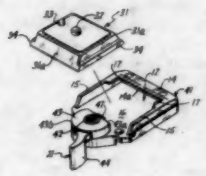
Filed Jun. 6, 1988, Ser. No. 202,403
Claims priority, application Japan, Aug. 7, 1987, 62-197344
Int. Cl.[5] G03B *17/00*
U.S. Cl. 354—293 15 Claims

1. In a panhead of the type including a tray mounted for movement about one or more axes relative to a panhead base, a shoe attachable to a device such as a camera, and shoe locking means movable between the locked position and a release position for releasably locking said shoe to said tray, the improvement comprising:

said tray including an interior wall and a pair of side walls which meet the interior wall and the bottom wall,

retaining means on said side walls adjacent said interior wall of said tray,

said shoe including means cooperating with said retaining mean on said tray for holding said shoe against separation from said tray by force of gravity alone notwithstanding tilting of said tray about any of said axes with said shoe locking means in said release position, and



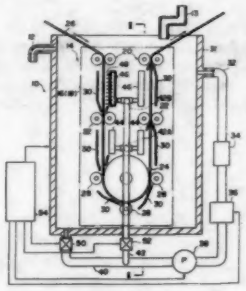
said shoe being manually disengageable from said retaining means with said shoe locking means in the release position.

4,929,974

DEVELOPING APPARATUS

Kiichiro Sakamoto, Kanagawa, and Hideo Iwasaki, Tokyo, both of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 4, 1989, Ser. No. 389,717
Claims priority, application Japan, Aug. 8, 1988, 63-197469
Int. Cl.[5] G03D *3/02*
U.S. Cl. 354—299 18 Claims



1. A developing apparatus comprising:

a tank for holding a processing solution for a photosensitive material;

means for conveying said photosensitive material, provided in said tank; and

means for circulating said processing solution including discharge means for discharging said processing solution contained in said developing tank and supply means for supplying said discharged processing solution to said developing tank, said supply means comprising;

first supply means for supplying a part of said discharged processing solution to said developing tank, and second supply means provided with guide means for supplying, as a jet, a part of said discharged processing solution to a surface of said photosensitive material while said photosensitive material is being conveyed through said developing tank,

and in said supply means a ratio of supply amounts of said first and second supply means can be changed;

whereby a degree of developing progress of said photosensitive material is adjusted and graduation of said photosensitive material is achieved.

4,929,975

AUTOMATIC FILM PROCESSOR

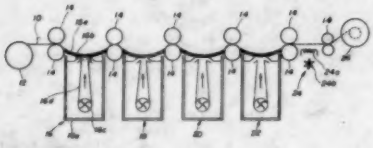
Shinichi Shidara, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 12, 1988, Ser. No. 243,349

Claims priority, application Japan, Sep. 11, 1987, 62-226669; Sep. 11, 1987, 62-226670; Sep. 11, 1987, 62-226671; Sep. 11, 1987, 62-226672

Int. Cl.[5] G03D *3/04, 3/08*

U.S. Cl. 354—317 14 Claims



1. An automatic film processor for passing an exposed film successively through a series of treating liquid vessels respectively containing developing liquid, fixing liquid and rinsing water, which comprises:

pump means for forming a constant regular flow to raise a portion of a liquid surface of at least one of a plurality of treating liquid vessels; and

flow guide means for guiding said constant regular flow onto said liquid surface;

whereby the underside of an exposed film is allowed to contact the surface of said raised portion of said liquid.

4,929,976

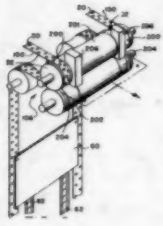
FILM TRANSPORT SYSTEM

John A. Cunninghasa, Garland; Mark O. Prestjohn, Coppell; Bobby P. Reed, Seagoville, and Martin D. Smith, Lewisville, all of Tex., assignors to Jamieson Film Company, Dallas, Tex.

Filed Mar. 15, 1989, Ser. No. 323,838

Int. Cl.[5] G03D *3/13*

U.S. Cl. 354—322 11 Claims



1. Film processing apparatus, comprising:

a housing;

a pair of continuous belts disposed within said housing in a laterally spaced relationship;

guide means within said housing for guiding said belts about parallel paths through said housing;

drive means engaged with said belts for driving said belts in synchronization about said paths;

a film carrier having attachment means for selectably engaging said belts, such that said film carrier is transported through said housing by said belts; and

wherein each of said belts has two laterally spaced longitudinal rows of apertures, with apertures of a first one of said rows being engageable with said drive means and apertures of a second one of said rows being engageable with said film carrier.

4,929,977

FLASH PHOTOGRAPHY CHANGEOVER DEVICE

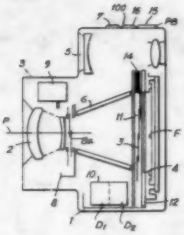
Tadashi Ishikawa; Shigeru Tagami; Kazuo Akimoto; Hiroto Tsuyuki; Michio Kawai; Kanji Ito; Takayuki Sato; Takahito Otora, and Teruyo Hayakawa, all of Chiba, Japan, assignors to Seikosha Co., Ltd., Tokyo, Japan

Filed Jul. 10, 1989, Ser. No. 377,674

Claims priority, application Japan, Jul. 11, 1988, 63-172189; Jul. 11, 1988, 63-172190

Int. Cl.[5] G03B *7/00, 15/03*

U.S. Cl. 354—420 10 Claims



1. In a camera having a lens shutter for performing a programmed exposure and aperture control, and a focal-plane shutter, a flash photography changeover device comprising:

(a) first changeover means for selecting one of the following modes of operation:

(i) a lens shutter mode in which the lens shutter is operated as a programmed shutter, and

(ii) a focal-plane shutter mode in which the shutter speed is controlled by the focal-plane shutter and the aperture is controlled by the lens shutter;

(b) first driving means for controlling at least one of the following:

(i) a programmed exposure value of the lens shutter, and

(ii) the size of said aperture of said lens shutter;

(c) second driving means for controlling the shutter speed of the focal-plane shutter; and

(d) sequence control means for controlling operation timings of said first and second driving means;

(e) setting means for selecting and setting automatic exposures with ambient light and a flash light; and

(f) coercive changeover means for setting said lens shutter mode irrespective of the setting of said first changeover means when said setting means is set to automatic exposure with the flash light.

4,929,978

COLOR CORRECTION METHOD FOR COLOR COPIER UTILIZING CORRECTION TABLE DERIVED FROM PRINTED COLOR SAMPLES

Katsuhiro Kanamori, Kawasaki; Yoshimitsu Kanno, Sagamihara; Toshiharu Kurosawa, Yokohama; Hidehiko Kawakami, Tokyo; Motohiko Naka, and Hiroaki Kotera, both of Kawasaki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Oct. 24, 1988, Ser. No. 261,254

Claims priority, application Japan, Oct. 23, 1987, 62-268575; Nov. 4, 1987, 62-278623; Jul. 13, 1988, 63-174559

Int. Cl.[5] G03B *27/80*

U.S. Cl. 355—38 6 Claims

1. In a method for developing a color correction table for color correction for a color copier apparatus including color scanning means for scanning an original color image to obtain successive input color values each expressed in a tri-color space, a color correction table memory responsive to respective ones of said input color values for producing corrected data comprising corresponding output color values, and color

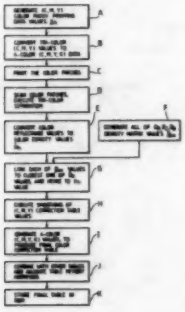
printing means responsive to said output color values for reproducing said original color image as an input color image, the improvement whereby said color correction table memory is produced by steps of:

(a) computing a set of color patch printing color values for use in printing respective ones of a set of color patches of respectively different sample colors;

(b) supplying said color patch printing color values to said color printing means for producing a printed set of color patches;

(c) scanning said printed set of color patches by said color scanning means for obtaining a set of color patch input data values, and temporarily storing said color patch input data values;

(d) generating a set of matrix input data values which form a regular 3-dimensional matrix array of color vanes when expressed in said tri-color color space, said set of matrix



input data values comprising all of said input color values that can be produced by said color scanning means;

(e) for each of said matrix input data values, executing a computation to find one of said color patch input data values that is closest to said each matrix input data value within said tri-color space, and linking said each matrix input data value to one of said color patch printing color values which corresponds to said closest color patch input data value, to establishing said each matrix input data value and said corresponding color patch printing color value as input and output values respectively of an initial color correction table;

(f) executing 3-dimensional smoothing processing of all output values of said initial color correction table to obtain a final color correction table; and

(g) storing said final color correction table in memory means as said color correction table memory.

4,929,979

METHOD AND APPARATUS FOR PROCESSING IMAGE

Tetsuo Kimoto, and Yoshinori Abe, both of Hachioji, Japan, assignors to Konica Corporation, Japan

Filed Jan. 27, 1989, Ser. No. 303,724

Claims priority, application Japan, Jan. 29, 1988, 63-18868; Jan. 29, 1988, 63-18877; Jan. 29, 1988, 63-18878; Aug. 2, 1988, 63-193038

Int. Cl.[5] G03B *27/72*

U.S. Cl. 355—38 **7 Claims**

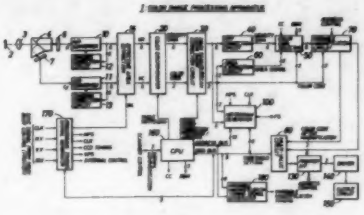
1. An image processing apparatus comprising:

pixel data generating means for generating density data representing a density of each pixel of original image data and color data representing a color of each pixel, the density and color data being parallel data;

mode setting means for outputting a mode setting signal for setting a write mode and a read mode;

memory means capable of being arbitrarily set in the write mode and the read mode in response to the mode setting signal, said memory means being operated such that a memory content is changed in correspondence with the density data and the color data in the write mode and that a memory content corresponding to the color data externally accessed is read out in the read mode;

threshold value setting means for setting threshold values in



units of color data on the basis of the memory content read out from said memory means in the read mode;

recording density data forming means for forming recording density data having a smaller number of bits by the set threshold values on the basis of the density data; and

recording means for performing recording on the basis of the recording density data.

4,929,980

DOCUMENT SUPPORT TABLE WITH LUBRICANT AND METHOD FOR FORMING THE SAME

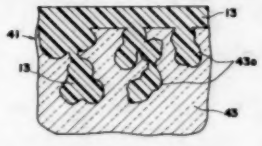
Tetsuo Kyogoku; Masamitsu Ishiyama, and Masayuki Mino, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Japan

Filed Dec. 7, 1988, Ser. No. 281,253

Claims priority, application Japan, Dec. 10, 1987, 62-312595; Dec. 10, 1987, 62-312596

Int. Cl.[5] G03B *27/62*

U.S. Cl. 355—75 **13 Claims**



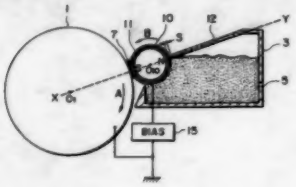
1. A document support member for use in a copier, comprising:

a transparent substrate;

a transparent surface layer formed on the surface of said transparent substrate, said surface layer being formed by spreading fine ceramic particles on said transparent substrate and subsequently sintering said fine ceramic particles to thereby form numerous minute spaces on said surface layer; and

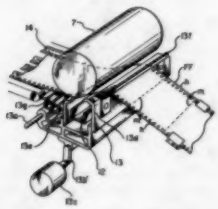
a lubricant filling said numerous minute spaces to provide a thin lubricant layer.

4,929,981
DEVELOPING APPARATUS
Takahiro Kubo, Tokyo, and Hatsuo Tajima, Matsudo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Jun. 23, 1988, Ser. No. 210,250
Claims priority, application Japan, Jun. 29, 1987, 62-159714
Int. Cl.[5] G03G 15/09
U.S. Cl. 355—253 9 Claims



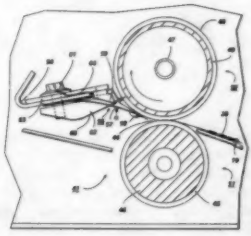
1. A developing apparatus for developing an electrostatic latent image, comprising:
- a rotatable cylindrical member, disposed opposed or contacted to an image bearing member in a developing zone, for carrying a developer thereon to the developing zone to supply the developer to the image bearing member;
- magnetic field generating means stationarily disposed in said cylindrical member, said magnetic field generating means including only two magnetic poles adjacent outer periphery thereof, said two magnetic poles being substantially on a line passing through a center of said cylindrical member, wherein one of said magnetic poles forms a magnetic field in the developing zone;
- means for supplying a developer on said cylindrical member; and
- regulating means for regulating a thickness of a developer layer formed on said cylindrical member, wherein said regulating member is disposed in a magnetic field formed by the other magnetic pole.

4,929,982
SHEET PATH IN AN ELECTROPHOTOGRAPHIC PRINTER
Masayuki Ainoya, Mito; Takeyuki Ishihara, Yokohama; Tesuo Kanno, Fujisawa; Takahiro Kikuchi, Katsuta; Seiichi Mori, Fujisawa; Shogo Nobumori, and Junji Shirakawa, both of Katsuta, all of Japan, assignors to International Business Machines Corporation, Armonk, N.Y.
Filed May 18, 1989, Ser. No. 353,846
Claims priority, application Japan, May 25, 1988, 63-126019
Int. Cl.[5] G03G 15/00
U.S. Cl. 355—311 9 Claims



1. An electrophotographic printer comprising a photosensitive drum comprising;
- a form feeder having means for feeding cut sheets to said photosensitive drum and means for feeding fan-fold forms to said photosensitive drum both means being provided in parallel adjacent to said photosensitive drum;
- a frame being driven toward said photosensitive drum to allow forms fed by said form feeder to make contact with said photosensitive drum;
- means provided on said frame for transferring images on said photosensitive drum to the forms made contact with said drum;
- a conveyor belt for sucking forms from said transfer means with a suction pressure to convey said forms;
- means for fixing transferred images on the forms conveyed by said conveyor belt; and
- means for discharging the forms from said fixing means.

4,929,983
STRIPPER MECHANISM
Arthur A. Barton, Webster; Frederick C. DeBolt, Penfield; Michael R. Elter, Webster; Paul M. Fromm, Rochester; Frank A. Grossi, Webster; Mark T. Miller, Rochester; Kenneth R. Rasch, Webster, and Thomas F. Szlucha, Fairport, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.
Filed Apr. 7, 1989, Ser. No. 334,416
Int. Cl.[5] G03G 21/00
U.S. Cl. 355—315 23 Claims

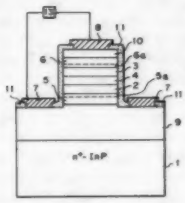


1. A stripper member for separating a print substrate from a fuser member in an electrostatographic printing machine comprising a substantially flat, thin, resiliently flexible finger-like member having a raised dimple-like bump adjacent one end of said finger-like member for contacting said print substrate when stripped from said fuser member, said finger-like member being coated on both sides with a smooth low surface energy film.

4,929,984
RESONANT TUNNELLING BARRIER STRUCTURE DEVICE
Shunichi Muto; Tsuguo Inata; Atsushi Takeuchi, all of Isehara, and Yoshihiro Sugiyama, Atsugi, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan
Filed Nov. 1, 1988, Ser. No. 265,814
Claims priority, application Japan, Nov. 10, 1987, 62-282057
Int. Cl.[5] H01L 27/12
U.S. Cl. 357—4 7 Claims

1. A resonant tunnelling barrier structure device comprising:
- an InP substrate; and
- a resonant tunnelling barrier structure formed on said InP substrate and consisting of at least two barrier layers of $Al_xGa_{1-x}As$-ySb_{1-y} ($0 \leqq x \leqq 1$, $y=0.51+0.05x$), at least one well layer of InP or $In_zGa_{1-z}As$ ($0.52 \leqq z \leqq 0.54$) sandwiched between said barrier layers, and two doped

layers of InP or $In_zGa_{1-z}As$ holding all of said barrier layers and said well layer therebetween, said barrier layers, well layers and doped layers being lattice-matched to InP of said substrate.

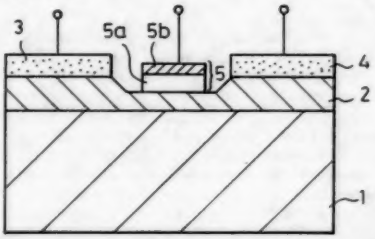


4,929,985

COMPOUND SEMICONDUCTOR DEVICE

Kanetake Takasaki, Tokyo, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed May 2, 1989, Ser. No. 346,456
Claims priority, application Japan, May 18, 1988, 63-119390
Int. Cl.[5] H01L *29/48*
U.S. Cl. 357—15 **5 Claims**



1. A compound semiconductor device comprising: a III–V group compound semiconductor substrate and a Schottky junction electrode of a p-type amorphous silicon carbide (a-SiC) layer provided on the III–V group compound semiconductor substrate and an amorphous silicon-germanium-boron (a-Si-Ge-B) layer provided on the p-type amorphous silicon carbide layer.

4,929,986

HIGH POWER DIAMOND TRAVELING WAVE AMPLIFIER

Max N. Yoder, Falls Church, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

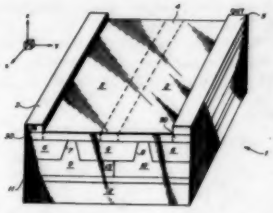
Filed Sep. 25, 1987, Ser. No. 101,919
Int. Cl.[5] H01L *29/80*
U.S. Cl. 357—22 **5 Claims**

1. An FET device comprising one or more FET stages, each stage of said one or more stages comprising:

a channel, a source, a gate and a drain formed in a single monolith;

said each stage comprising an input portion comprised of said source and said gate, an output portion comprised of said drain and said gate, said input and said output portions having mirror image geometry with respect to one another;

said mirror image geometry and the forming of said input portion and said output portion from said single monolith, being effective to make the phase velocity of electromagnetic signals propagating in said input portion and said output portion virtually identical; and



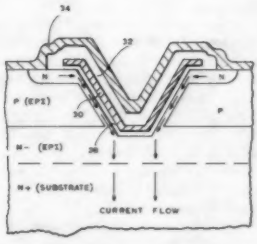
said channel of said each stage is a diamond layer in said monolith.

4,929,987

METHOD FOR SETTING THE THRESHOLD VOLTAGE OF A POWER MOSFET

Willem G. Einthoven, Belle Meade, N.J., assignor to General Instrument Corporation, New York, N.Y.

Division of Ser. No. 150,755, Feb. 1, 1988, Pat. No. 4,859,621.
This application May 30, 1989, Ser. No. 358,883
Int. Cl.[5] H01L *29/78*
U.S. Cl. 357—234 **2 Claims**



1. A vertical MOSFET formed on a substrate with a <100> crystal orientation comprising a top layer of a first conductivity type, a middle layer of a lightly doped second conductivity type, a bottom layer of a relatively heavily doped second conductivity type, the middle and bottom layers being formed to act as a drain, the top and middle layers forming a junction at least a portion of which is substantially parallel to the substrate surface and a second conductivity type region formed in said top layer to act as a source, the threshold voltage of the MOSFET being set by a method comprising the steps of: an anisotropically etching a groove with a substantially flat bottom through the second conductivity type region and into the top layer, the bottom of the groove initially being above the junction; exposing the substrate to a beam of ions of the second conductivity determining type so as to form as substantially continuous implanted region extending below said junction; anisotropically etching the substrate a second time to remove the portion of the implanted region proximate the groove bottom such that the final level of the groove bottom is within the middle layer below the junction and said implanted region operably connects the second conductivity type region with said middle layer, and after the threshold voltage is set, forming an insulating layer along the sides and bottom of the groove and forming a gate on said insulating layer.

4,929,988

NON-VOLATILE SEMICONDUCTOR MEMORY DEVICE AND METHOD OF THE MANUFACTURE THEREOF

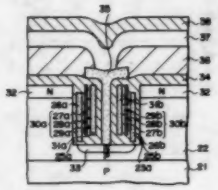
Kuniyoshi Yoshikawa, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 23, 1988, Ser. No. 235,121

Claims priority, application Japan, Aug. 25, 1987, 62-210774

Int. Cl.[5] H01L *29/78, 29/34, 29/06, 23/48*

U.S. Cl. 357—23.5 **7 Claims**



1. A non-volatile memory device comprising:

first semiconductor region of a first conductivity type;

a groove formed in said first semiconductor region to extend in a predetermined direction;

insulating separation regions formed to selectively fill the inside of said groove so that said groove is divided into a plurality of groove portions;

a second semiconductor region of a second conductivity type formed in a surface of said first semiconductor region and serving as a source region;

a pair of first gate insulating layers formed on opposed side walls of a groove portion of said plurality of groove portions defined by said insulating separation regions and said first semiconductor region, said side walls extending along the direction of extension of said groove;

a pair of floating gate electrodes formed on surfaces of said first gate insulating layers opposite to surfaces of said first gate insulating layers contacting said side walls of said groove portion, with said floating gate electrodes having tops on a plane different from a plane of a top of said second semiconductor region;

a pair of second gate insulating layers formed on surfaces of said floating gate electrodes opposite to surfaces thereof contacting said first gate insulating layers;

a pair of control gate electrodes formed on surfaces of said second gate insulating layers opposite to surfaces thereof contacting said floating gate electrodes;

a third semiconductor region of said second conductivity type formed in a surface region of said first semiconductor region and located at a bottom of said groove portion, said third semiconductor region serving as a drain region; and

a fourth semiconductor region formed within said groove portion and contacting said third semiconductor region, said fourth semiconductor region being doped with impurities of said second conductivity type.

4,929,989

MOS TYPE SEMICONDUCTOR DEVICE POTENTIAL STABILIZING CIRCUIT WITH SERIES MOS CAPACITORS

Kiminori Hayano, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

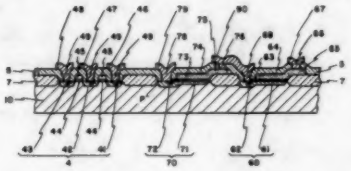
Filed May 9, 1989, Ser. No. 349,093

Claims priority, application Japan, May 10, 1988, 63-114292

Int. Cl.[5] H01L *29/78, 27/02;* **H03K** *3/01*

U.S. Cl. 357—23.6 **6 Claims**

1. A semiconductor device comprising a semiconductor substrate having a major surface of a first conductivity type, a thick field insulating layer selectively formed on said major surface of said substrate, a first power voltage supply line for supplying a first voltage extending on said thick field insulating layer, a second power voltage supply line for supplying a second voltage different from said first voltage extending on said thick field insulating layer, an insulated gate field effect transistor formed on said substrate, said transistor having a gate insulating film formed on said major surface of said substrate, a first impurity region of a second conductivity type opposite to said first conductivity type formed in said major surface of said substrate and surrounded by said thick field insulating layer, a first dielectric film formed on said first impurity region, said first dielectric film being made of the same material as said gate insulating film of said transistor and having the same thickness as said gate insulating film of said transistor, a first electrode formed on said first dielectric film, a second impurity region of said second conductivity type formed in said major surface of said substrate and surrounded by said thick field insulating layer, a second dielectric film formed on said second impurity region, said second dielectric film being made of the same material as said gate insulating film of said transistor and



having the same thickness as said gate insulating film of said transistor, a second electrode formed on said second dielectric film, a first connecting means for connecting electrically said first power voltage supply line and said first impurity region each other, a second connecting means for connecting electrically said first electrode and said second impurity region each other, and a third connecting means for connecting electrically said second impurity region and said second power voltage supply line each other,

whereby a first MOS type capacitor is constituted by said first impurity region, said first dielectric film and said first electrode; a second MOS type capacitor is constituted by said second impurity region, said second dielectric film and said second electrode; and a stabilizing circuit for suppressing a voltage fluctuation on said first and/or second power voltage supply line is constituted by the series connection of said first and second MOS type capacitors and is connected to and between said first and second power voltage supply lines.

4,929,990

SEMICONDUCTOR MEMORY DEVICE

Masahiro Yoneda, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 30, 1988, Ser. No. 213,492

Claims priority, application Japan, Jul. 1, 1987, 62-164409

The portion of the term of this patent subsequent to Dec. 12, 2006, has been disclaimed.

Int. Cl.[5] H01L *27/04;* **G11C** *11/40*

U.S. Cl. 357—23.6 **8 Claims**

1. A dynamic-type semiconductor memory device, comprising:

a semiconductor substrate (1) having a main surface;

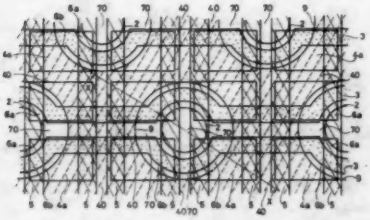
a plurality of word lines formed on said substrate;

a plurality of bit lines intersecting with said plurality of word lines;

a plurality of memory cells provided in correspondence with intersections of said word lines and said bit lines, each of said memory cells being included within a memory cell group formed of four adjacent memory cells arranged symmetrically about a common contact hole, each memory cell having a transistor (6) including a source region

(6a) formed around the common contact hole and a drain region (6b) formed radially outside of said source region (6a) with respect to said contact hole and a capacitor formed adjacent to an outer edge of said drain region (6b) with respect to said contact hole, said capacitor having a surface capacitor region (4a) parallel to said main surface and a trench capacitor region (40a) parallel to a side wall of a trench (40) formed in said main surface around an outer periphery of said capacitor region (4a);

a first electrical connection formed between two of said transistors and a common one of said bit lines through said common contact hole;



a second electrical connection formed between the remaining two of said transistors and another common one of said bit lines through said common contact hole;

a third electrical connection formed between two of said transistors which are respectively connected to different bit lines by said first electrical connection and a common one of said word lines; and

a fourth electrical connection formed between another remaining two of said transistors and another common one of said word lines,

whereby four memory cells included within a said memory cell group are controlled by only two said bit lines and two said word lines.

4,929,991

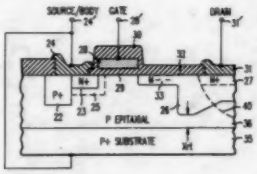
RUGGED LATERAL DMOS TRANSISTOR STRUCTURE

Richard A. Blanchard, Los Altos, Calif., assignor to Siliconix Incorporated, Santa Clara, Calif.

Continuation of Ser. No. 119,761, Nov. 12, 1987, abandoned. This application Apr. 5, 1989, Ser. No. 334,806

Int. Cl.[5] H01L *29/78*

U.S. Cl. 357—23.8 **8 Claims**



1. A DMOS transistor having source, body, gate and drain regions arrayed laterally on the surface of a semiconductor, said transistor comprising:

a substrate having a first conductivity type;

an epitaxial layer of semiconductor material having said first conductivity type and a doping level less than that of said substrate deposited on said substrate to a first thickness;

a body contact region having said first conductivity type and extending from said epitaxial layer surface part way therethrough to form an ohmic contact;

a source region having a conductivity type opposite to said first conductivity type abutting said body contact region along one edge and extending from said epitaxial layer into said epitaxial layer with the opposite edge of said source region facing said body contact region of said DMOS transistor:

a body region having said first conductivity type in said epitaxial layer and in contact with said source region;

a drain region, spaced laterally from and facing said source region and having said opposite conductivity type, extending from said epitaxial layer surface into said epitaxial layer to a second thickness that is less than said first thickness by an amount that creates a drain depletion region reachthrough breakdown voltage, associated with reverse drain bias, at a voltage level below that of an avalanche breakdown voltage of said drain electrode; and

a gate region extending from said source region to said drain region;

wherein said drain region includes a region doped with impurities of said first conductivity type, said drain region having a concave shaped portion at a surface thereof facing said substrate to control the behavior of said drain depletion region under reverse bias conditions.

4,929,992

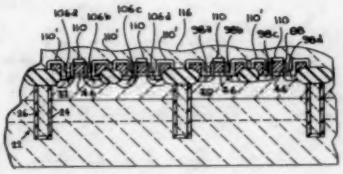
MOS TRANSISTOR CONSTRUCTION WITH SELF ALIGNED SILICIDED CONTACTS TO GATE, SOURCE, AND DRAIN REGIONS

Mammen Thomas, San Jose, and Matthew Weinberg, Mountain View, both of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Continuation-in-part of Ser. No. 777,149, Sep. 18, 1985. This application Jun. 2, 1986, Ser. No. 869,759

Int. Cl.[5] H01L *29/78, 29/04, 27/12*

U.S. Cl. 357—23.9 **1 Claim**



1. An improved integrated circuit structure having one or more MOS devices formed therein comprising:

(a) a P type silicon substrate having an N+ buried layer formed therein, an N type epitaxial silicon layer grown over said buried layer, and oxide isolation regions formed in said epitaxial layer and extending into said structure sufficiently to provide isolation between adjacent devices formed therein;

(b) a polysilicon gate having a raised contact portion formed over a gate oxide layer on said epitaxial layer overlying a channel region formed in said epitaxial layer;

(c) oxide spacer means on the sidewall of said raised gate contact portion;

(d) source and drain regions formed in said epitaxial layer contiguous with said channel region and separated from adjacent devices in said structure by said isolation oxide regions;

(e) polysilicon source and drain contacts on said epitaxial layer raised to approximately the same level as said raised polysilicon gate contact;

(f) metal silicide conductive layer portions respectively overlying said source and drain regions in said epitaxial layer and over the sides and tops of said raised polysilicon source and drain contacts to thereby provide horizontal conductive paths extending from said oxide spacer means on the sidewalls of said raised polysilicon gate contact to said raised polysilicon source and drain contacts, and

vertical conductive paths from said respective horizontal conductive paths up the sides of said raised polysilicon source and drain contacts to decrease the resistance of the horizontal and vertical conductive paths respectively between the source and drain regions in said epitaxial layer and the metal silicide on the top of said raised polysilicon source and drain contacts to which metal contacts will subsequently be formed; and

(g) a layer of insulating material over said structure which has been planarized to expose the tops of said raised source, gate, and drain contacts;

whereby said structure having said raised contacts of even height comprises a highly planarized surface with self-aligned contacts and low resistance paths respectively between said tops of said raised source and drain contacts and said source and drain regions in said epitaxial layer.

4,929,993

HALL ELEMENT DEVICE WITH DEPLETION REGION PROTECTION BARRIER

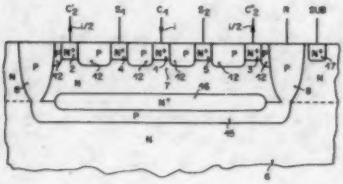
Radivoje Popovic, Zug, Switzerland, assignor to LGZ Landis & Gyr Zug AG, Zug, Switzerland

Filed Apr. 25, 1986, Ser. No. 856,460

Claims priority, application Switzerland, May 22, 1985, 02175/85

Int. Cl.[5] H01L 27/22

U.S. Cl. 357—27 **6 Claims**



1. An electronic comprising a Hall element incorporated in an integrated circuit, said Hall element having a surface and having an active zone below said surface, said Hall element comprising

at least two sensor connection contacts,

at least three current connection contacts arranged at said surface,

a depletion region located at least between said surface and said active zone,

an oxide layer arranged on said surface, and

an electronically conducting gate layer having a gate connection and arranged on top of said oxide layer to cover at least the top of said active zone, whereby a portion of said depletion region covering said active zone is generated when an electrical voltage is connected to said gate connection,

said conducting gate layer comprising three parallel and separated sub-gate layers, one of said sub-gate layers being a center gate layer covering the part of said active zone which incorporates three of said sensor and current connection contacts of said Hall element, each of the other two sub-gate layers covering a portion of said active zone incorporating a remaining connection contact of said Hall element, each of said sub-gate layers having a gate connection.

4,929,994

SOLID-STATE IMAGING DEVICE WITH MULTIPLE DIELECTRIC LAYERS

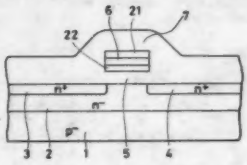
Kazuya Matsumoto, Ina, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Apr. 4, 1988, Ser. No. 177,280

Claims priority, application Japan, Apr. 28, 1987, 62-103135

Int. Cl.[5] H01L 27/14

U.S. Cl. 357—30 **3 Claims**



1. A solid-state imaging device using an MIS light-receiving device which includes a photoelectrical conversion portion and a signal storage portion, said solid-state imaging device comprising:

a gate electrode disposed on a surface of a semiconductor with a gate insulating film, formed of SiO_2, therebetween, said gate electrode formed of a polysilicon film having a thickness of 600 Å;

a protection film formed on said gate electrode formed of SiO_2;

a first intermediate film disposed between said gate electrode and said protection film, and said first intermediate film formed of a Si_3N_4 film having a thickness of 600 Å; and

a second intermediate film disposed between said gate electrode and said gate insulating film, and said second intermediate film formed of a Si_3N_4 film having a thickness of 900 Å wherein the thickness of each said film of said solid-state imaging device reduces a level of reflection between said films to enable maximum light transmissivity.

4,929,995

SELECTIVE INTEGRATED CIRCUIT INTERCONNECTION

David R. Gifford, San Antonio, Tex., assignor to Honeywell Inc., Minneapolis, Minn.

Division of Ser. No. 156,378, Feb. 16, 1988, Pat. No. 4,849,365. This application Mar. 17, 1989, Ser. No. 324,933

Int. Cl.[5] H01L 21/265, 21/263, 21/26

U.S. Cl. 357—34 **2 Claims**

1. A monolithic integrated circuit structure permitting selectively providing a permanent, relatively high conductivity electric current flow path between two regions therein which are initially electrically isolated from one another, said structure comprising:

a semiconductor material body of a first conductivity type in at least a first portion thereof, said first portion serving as a first interconnection region, except in a selected region in said first portion, said semiconductor matrerial body having a major surface wherein said first interconnection region intersects said major surface to form a first major surface area a first ohmic contact made to said first major surface area by a first interconnection means;

said selected region being of a second conductivity type except in a surface intersecting portion therein which intersects said major surface, said selected region being removed in said first portion from any contact with said first ohmic contact; and

said surface intersecting portion serving as a second interconnection region and being of said first conductivity type, said second interconnection region having a first dopant distributed tehrein, said second interconnection region having a second ohmic contact made thereto at said major surface by a second interconnection means, said selected region and said second interconnection region extending in a direction substantially parallel to said first major surface area in said first interconnection region asymmetrically with respect to said first ohmic contact a sufficient extent to provide an irradiation location in said major surface intersecting said second interconnection region, said irradiation location capable of receiving radiation to diffuse said first dopant through said selected region.

4,929,996

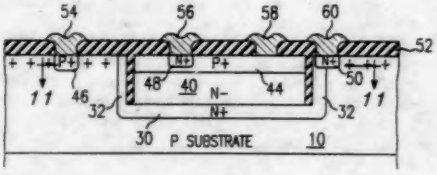
TRENCH BIPOLAR TRANSISTOR

Louis N. Hutter, Richardson, Tex., assignor to Texas Instruments Incorporated, Tex.

Filed Jun. 29, 1988, Ser. No. 213,212

Int. Cl.[5] H01L *29/72*

U.S. Cl. 357—34 **25 Claims**



1. A bipolar transistor, comprising:

a trench depression having side walls formed in a semiconductor substrate;

a heavily doped layer of semiconductor material in the said sidewalls of trench depression forming a shell around said trench depression;

an insulating layer formed on sidewalls of said trench depression, a bottom portion of said trench depression being defined by said heavily doped shell;

a semiconductor collector material formed in a lower portion of said trench depression;

a semiconductor base material formed within said collector material; and

a semiconductor emitter material formed in said base material.

4,929,997

HETEROJUNCTION BIPOLAR TRANSISTOR WITH BALLISTIC OPERATION

Kazuhiko Honjo, and Shin-Ichi Tanaka, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Dec. 22, 1987, Ser. No. 136,589

Claims priority, application Japan, Dec. 22, 1986, 61-307044; Jun. 2, 1987, 62-139154; Jun. 24, 1987, 62-158100; Jun. 24, 1987, 62-158101

Int. Cl.[5] H01L *29/72*

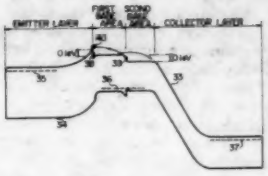
U.S. Cl. 357—34 **22 Claims**

1. A heterojunction bipolar transistor comprising:

(a) an emitter region formed of a first semiconductor material of a first conductivity type;

(b) a base region having a plurality of base areas including first and second base areas respectively formed of second and third semiconductor materials of a second conductivity type opposite to said first conductivity type; and

(c) a collector region formed of a fourth semiconductor material of said first conductivity type and forming a junction together with said base region, wherein said first and second semiconductor materials form a first heterojunction with a first abrupt potential discontinuity providing a first kinetic energy to a carrier injected from said emitter region, and said second and third semiconductor



materials form a second heterojunction with a second abrupt potential discontinuity providing a second kinetic energy to said carrier traveling over said base region, said first, second and third semiconductor materials being different in electron affinity from one another, wherein said first and second kinetic energies respectively correspond to energy gaps between the bottom edges of the conduction bands of said first and second semiconductor materials and between the bottom edges of the conduction bands of said second and third semiconductor materials.

4,929,998

INTEGRATED CIRCUIT HAVING PLURAL CAPACITANCES OF DIFFERENT VALUES

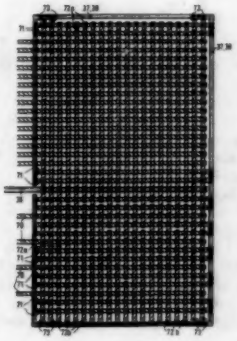
Arnoldus J. J. Boudewijns, Eindhoven, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.

Continuation of Ser. No. 810,440, Dec. 17, 1985, abandoned. This application Oct. 25, 1988, Ser. No. 263,992

Claims priority, application Netherlands, Dec. 24, 1984, 8403932

Int. Cl.[5] H01L *27/10, 27/15*

U.S. Cl. 357—45 **9 Claims**



1. An integrated circuit comprising plural capacitances, each with a first and second connection electrode, which have different capacitance values, said circuit comprising a semiconductor body, rows of first capacitance electrodes arranged beside each other at a surface of said body, a dielectric layer, and second capacitance electrodes, each of said first capacitance electrodes being separated by said dielectric layer from one of said second capacitance electrodes, the first and second connection electrodes comprising the electrodes of a plurality

of basic capacitances arranged in rows, different numbers of basic capacitances between one or more first and one or more associated second connection electrodes being connected in parallel with each other to form the capacitances having different capacitance values by interconnection of first and second capacitance electrodes, plural rows of basic capacitances having the same number n of first capacitance electrodes and each of these rows of n basic capacitances having a first row conductor by means of which all n first capacitance electrodes of the row are interconnected, one or more rows of interconnected first capacitance electrodes forming a first connection electrode, a first group of interconnected second capacitance electrodes of said rows of n basic capacitances forming a second connection electrode associated with said first electrode, a plurality of dummy basic capacitances, and a second group of interconnected second capacitance electrodes of said rows of n basic capacitances which form a third connection electrode, the third connection electrode comprising second capacitance electrodes of said dummy basic capacitances, and, in a first row of n basic capacitances, the number of second capacitance electrodes in said first row belonging to an associated second connection electrode being at least one and smaller than in a second of said rows of n basic electrodes.

4,929,999

COMBINATION OF A SUPPORT AND A SEMICONDUCTOR BODY AND METHOD OF MANUFACTURING SUCH A COMBINATION

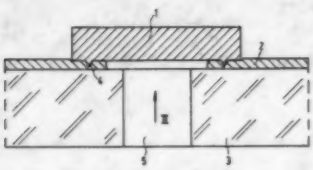
Arthur M. E. Hoeberechts, and Petrus J. M. Peters, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 4, 1989, Ser. No. 334,063

Claims priority, application Netherlands, Apr. 8, 1988, 8800901

Int. Cl.[5] H01L *23/48, 29/44, 29/52*

U.S. Cl. 357—68 **4 Claims**



1. A combination of a support and a semiconductor body, in which a deformable metal layer is disposed between the semiconductor body and the support and the semiconductor body is connected to the support by pressing the semiconductor body and the support against each other under pressure while heating the metal layer, characterized in that the semiconductor body is provided at its surface facing the support with at least one projecting part, which is embedded in the metal layer.

4,930,000

TERMINAL ASSEMBLY FOR AN INTEGRATED SEMICONDUCTOR CIRCUIT

Dieter Kantz, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Continuation of Ser. No. 868,778, May 29, 1986, abandoned. This application Sep. 9, 1988, Ser. No. 243,206

Claims priority, application Fed. Rep. of Germany, May 31, 1985, 3519571

Int. Cl.[5] H01L *23/48, 29/44, 29/52, 29/60*

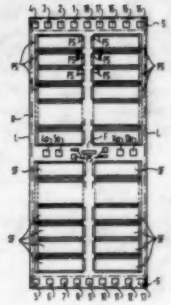
U.S. Cl. 357—68 **7 Claims**

1. Connecting arrangement for an integrated semiconductor circuit, comprising:

a semiconductor chip having a main surface and two opposite end surfaces; two contact regions within the main surface, each disposed adjacent a respective end surface and each having a respective first and second plurality of contact pads therein;

an electrically active surface within the main surface, disposed between the contact regions;

a first and a second circuit area disposed within said electrically active surface, each being adjacent a respective contact region; said first and second circuit area having first and second electrical circuit elements connected with said first and second plurality of contact pads in said contact regions;



at least one surface area free of electrical circuit elements disposed within said electrically active surface;

a further contact region having a third plurality of contact pads therein connected with said second circuit elements in said first and second circuit area, disposed within said electrically active surface; said further contact region disposed within said at least one surface area free of electrical circuit elements; and

wherein at least one of said contact pads in said further contact region is redundantly connected with a respective circuit element of said second electrical circuit elements.

4,930,001

ALLOY BONDED INDIUM BUMPS AND METHODS OF PROCESSING SAME

Ronald L. Williams, San Marcos, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Mar. 23, 1989, Ser. No. 327,867

Int. Cl.[5] H01L *23/48;* **B44C** *1/22;* **C23F** *1/02*

U.S. Cl. 357—71 **15 Claims**

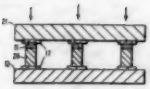
15. Apparatus comprising:

a substrate;

a bonding pad disposed on the substrate comprising a layer of titanium, a layer of nickel deposited over the titanium and a layer of gold deposited over the layer of titanium;

an indium bump etched in a low concentration of hydrochloric acid and pressed onto the bonding pad for a short

period of time to temporarily fuse the bump to the pad and heated for about one hour at approximately 100 degrees



Celsius to form an alloy bond between the bump and the pad.

4,930,002

MULTI-CHIP MODULE STRUCTURE

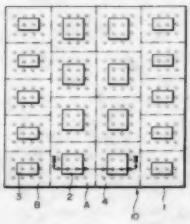
Takaji Takenaka; Tositada Netsu; Hidetaka Shigi, all of Hadano, and Masakazu Yamamoto, Kodaira, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 22, 1988, Ser. No. 171,770

Claims priority, application Japan, Apr. 1, 1987, 62-77518

Int. Cl.[5] H01L *23/16, 39/02*

U.S. Cl. 357—75 **4 Claims**



1. A pin grid array type multi-chip module structure comprising:

a ceramic multi-layer wiring board having opposing first and second surfaces;

a plurality of connecting pads arrayed on said first surface to mount a plurality of semiconductor devices on said first surface;

a plurality of through-holes within said board;

a plurality of I/O pins arrayed on said second surface including power supply pins and signal pins,

wherein a predetermined area of said board is divided into a plurality of divisional board areas each having the same size, each of said divisional board areas being allotted to individual semiconductor devices of a same type, said connecting pads, said through-holes and said I/O pins being supplied equally to each of said divisional board areas, and wherein positional relationships between said connecting pads, said through-holes and said I/O pins are substantially identical for each divisional board area; and,

a plurality of selected layers, wherein said selected layers include metallized patterns for supplying power inside said board, said patterns being connectable to said power supply pins via said through-holes whereby said patterns are made constant for each divisional board area.

4,930,003

BURST/CONTINUOUS WAVE CONVERTING APPARATUS FOR CONVERTING CONTINUOUS WAVE IN RESPONSE TO BURSTS

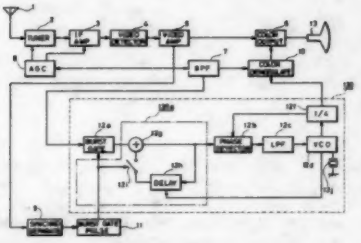
Nobukazu Hosoya, Nara, Japan, assignor to Sanyo Electric Co., Ltd., Moriguchi, Japan

Filed Sep. 9, 1988, Ser. No. 242,108

Claims priority, application Japan, Sep. 10, 1987, 62-226914

Int. Cl.[5] H04N *9/46*

U.S. Cl. 358—19 **8 Claims**



1. A burst/continuous wave converting apparatus, comprising:

burst signal means for intermittently supplying a burst signal having a predetermined frequency and phase at a constant repetition frequency;

PLL circuit means responsive to said supplied burst signal for generating a continuous wave having a controlled frequency and phase, said PLL circuit means comprises

voltage controlled oscillator means for generating said continuous wave, and

phase detector means for comparing phases of said supplied burst signal with said continuous wave output from said voltage controlled oscillator means;

delay means having a delay time which is approximately integer multiples of a cycle of said burst signal, said delay means utilizes an output of said voltage controlled oscillator means as a clock; and

switching means for directly applying said burst signal to said PLL circuit means in a period during which said burst signal is supplied and for applying said burst signal to said delay means to delay said burst signal by said delay time and to apply the delayed burst signal to said PLL circuit means in a period other than the period during which said burst signal is supplied.

4,930,004

AUTOMATIC LEVEL ADJUSTING SYSTEM FOR A TELEVISION RECEIVER

Yoshihiro Yamamoto, Tokyo; Junya Saito, and Masakazu Suzuki, both of Saitama, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Mar. 31, 1989, Ser. No. 332,003

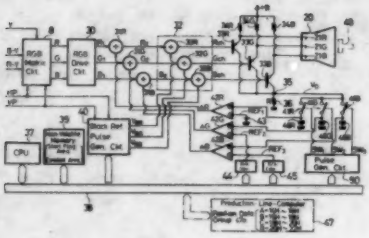
Claims priority, application Japan, Apr. 15, 1988, 63-092690

Int. Cl.[5] H04N *9/73*

U.S. Cl. 358—29 **17 Claims**

1. An improved television receiver of the type which includes a video signal source for supplying a video signal, picture reproducing means, an automatic level control circuit connected between said video signal source and said picture reproducing means, said automatic level control circuit including reference pulse insertion means for inserting a reference pulse signal into said video signal at a predetermined position,

level detecting means connected between said reference pulse insertion means and said picture reproducing means for detecting a signal level at said predetermined position, level correction means connected between said video signal source and said picture reproducing means, and control means connected to said level detecting means for controlling said level correction means such that the level of the video signal is corrected in response to said detected level, wherein the improvement comprises:



a non-volatile memory for storing a positional datum corresponding to said predetermined position, and

activating means connected between said non-volatile memory and said reference pulse insertion means for activating the latter to generate said reference pulse signal at said predetermined position in response to said positional datum stored in said non-volatile memory.

4,930,005

CIRCUIT FOR REMOVING CROSSTALK COMPONENTS IN A CARRIER CHROMINANCE SIGNAL

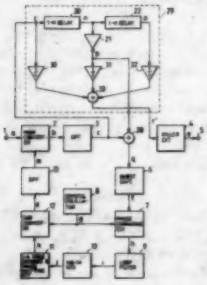
Hiroshi Yamada; Ryo Nakano, both of Yokohama; Yasutoshi Matsuo, Kawasaki, and Seiichi Mikami, Yokohama, all of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan

Filed Dec. 16, 1988, Ser. No. 285,263

Claims priority, application Japan, Dec. 18, 1987, 62-320872; May 19, 1988, 63-120576

Int. Cl.[5] H04N *5/21*

U.S. Cl. 358—36 **3 Claims**



1. A circuit for removing crosstalk components in a carrier chrominance signal, comprising:

(a) first delay circuit means responsive to said carrier chrominance signal;

(b) first ½ attenuation circuit means responsive to said carrier chrominance signal;

(c) inverter means responsive to an output signal from said first delay circuit means;

(d) second delay circuit means responsive to said output signal from said first delay circuit means;

(e) second ½ attenuation circuit means responsive to an output signal from said second delay circuit means;

(f) ½ attenuation circuit means responsive to an output signal from said inverter means;

(g) first adder means responsive to output signals from said first and second ½ attenuation circuit means and an output signal from said ½ attenuation circuit means thereby producing a crosstalk-removed carrier chrominance signal; and

(h) a second adder means responsive to said carrier chrominance signal and to said output signal from said inverter means, said first delay circuit, inverter means and said second adder means forming a comb filter for correcting a time delay due to said circuit for removing crosstalk components.

4,930,006

COLOR SOLID STATE IMAGE PICKUP ELEMENT WITH PLURAL PHOTOCELLS OF A SAME COLOR WITHIN A SUBUNIT THEREOF CONTROLLED BY A COMMON CONTROL LINE AND OUTPUTTING TO A COMMON SIGNAL LINE

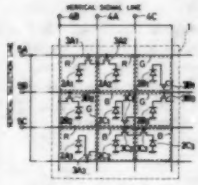
Jin Murayama; Yoshimitsu Kudoh, and Ryuji Kondo, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 31, 1987, Ser. No. 32,644

Claims priority, application Japan, Mar. 31, 1986, 61-71299

Int. Cl.[5] H04N *9/077, 9/07*

U.S. Cl. 358—44 **8 Claims**



1. A solid state image pickup element comprising:

an MOS image sensor comprising:

photoelectric conversion elements arranged in rows and columns;

vertical selection lines extending along the rows;

vertical signal lines extending along the columns;

a vertical switching means associated with each photoelectric conversion element and controlled by an associated vertical selection line for selectively connecting an output of the associated photoelectric element to an associated vertical signal line;

a horizontal switching means associated with each column for selectively connecting an associated vertical signal line to an output line;

a vertical shift register for controlling the vertical switching means through the vertical selection lines; and

a horizontal shift register for controlling the horizontal switching means;

the solid state image pickup element further comprising a color filter having one of l colors associated with each photoelectric conversion element; wherein

the photoelectric conversion elements are divided into sets of m×n contiguous photoelectric conversion elements, m and n being integers greater than one;

each set is divided into l groups of photoelectric conversion elements, wherein all of the photoelectric conversion elements in each group are associated with color filters having the same color; and

the vertical switching means associated with the photoelectric conversion elements in each group except one selectively connect the outputs of all of the photoelectric conversion elements in the group to one vertical signal line

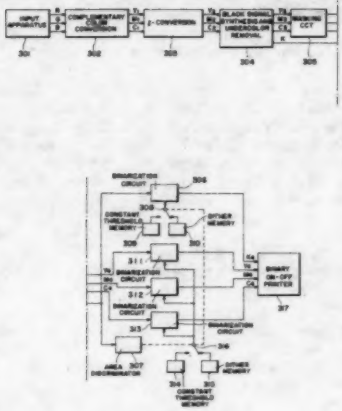
associated with the group, thereby producing a sum of the outputs of all of the photoelectric conversion elements in the group on the one vertical signal line, and the vertical switching means associated with the photoelectric conversion elements of said one group selectively connect the outputs of all of the photoelectric conversion elements in said one group to a plurality of vertical signal lines associated with said one group, thereby producing a sum of the outputs of all of the photoelectric conversion elements in said one group on the plurality of vertical signal lines.

4,930,007

DIGITAL COLOR IMAGE PROCESSING METHOD AND APPARATUS FOR DISCRIMINATING HIGH RESOLUTION AREAS OF A COLOR IMAGE SIGNAL AND CONTROLLING IMAGE PROCESSING IN ACCORDANCE WITH THE DISCRIMINATION

Susumu Sugiura, Yamato; Yasuo Kouzato, Tokyo, and Yukio Masuda, Atsugi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 58,625, Jun. 4, 1987, abandoned, which is a continuation of Ser. No. 608,238, May 8, 1984, abandoned.
This application May 30, 1989, Ser. No. 358,498
Claims priority, application Japan, May 10, 1983, 58-81140
Int. Cl.[5] H04N *1/46, 1/40*
U.S. Cl. 358—75 **33 Claims**



1. A color image processing method comprising the steps of:
discriminating whether a given area of a color image is a high-resolution area by performing an area-type discriminating operation on a specified color component of a color image signal, the color image signal having a plurality of color components and representing the color image; and
changing an image processing for the plurality of color components of the color image signal, including an image processing for the specified color component thereof, to an image processing for a line image on the basis of the result of discrimination in said discriminating step that the given area is a high-resolution area.

2. A color image processing method according to claim 1, wherein the specified color component is a black component.

18. An apparatus comprising:
(a) means for supplying a color image signal including a plurality of color component signals;
(b) means for generating a non-color component signal by using at least two of said plurality of color component signals; and
(c) means for discriminating whether an area of a color image with which the color image signal is associated is a high-resolution area on the basis of the non-color component signal generated by said generating means.

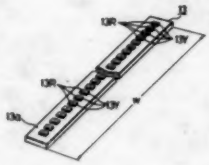
26. An apparatus comprising:
(a) means for supplying a color image signal including a plurality of color component signals;
(b) means for generating a non-color component signal by using at least two of said plurality of color component signals; and
(c) means for discriminating whether an area of a color image with which the color image signal is associated is a gray-level area on the basis of the non-color component signal generated by said generating means.

4,930,008

SCANNER FOR READING COLOR IMAGE

Kiyosuke Suzuki, and Hideki Wanami, both of Saitama, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Apr. 12, 1989, Ser. No. 336,722
Claims priority, application Japan, Apr. 25, 1988, 63-102303
Int. Cl.[5] H04N *1/028*
U.S. Cl. 358—75 **10 Claims**



1. A scanner of the type which optically scans an original color image, comprising:
(a) a plurality of light sources composed of a reddish-orange light emitting diode for emitting a reddish-orange light, a yellow light emitting diode for emitting a yellow light and a fluorescent light source for emitting a blue light, said plurality of light sources being arranged to selectively illuminate an original image and wherein the characteristic value of the light emitted from said reddish-orange light emitting diode is selected so as to have an overlap in wavelength with that of the light emitted from said yellow light emitting diode, and the characteristic value of the light emitted from said fluorescent light source is selected so as to have an overlap in wavelength with that of the light emitted from said yellow light emitting diode;
(b) a diode unit plate upon which said reddish-orange and yellow light emitting diodes are mounted;
(c) a line image sensor for receiving light supplied by said plurality of light sources which is reflected from the original image and producing a corresponding output signal;
(d) means for effecting relative movement between the original image and the line image sensor and plurality of light sources so that the original image is illuminated and sequentially scanned over a plurality of width-wise lines; and
(e) controlling means supplied with the output signal of said line image sensor for switching on and off said plurality of

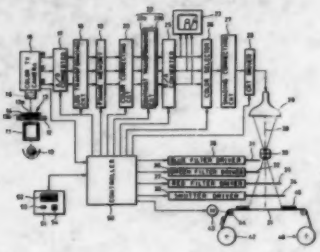
light sources sequentially and processing the line image sensor output signal to produce corresponding primary color image signals.

4,930,009

METHOD OF MAKING A PRINT OF COLOR SLIDE

Kazuo Shiota, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jun. 17, 1988, Ser. No. 207,977
Claims priority, application Japan, Jun. 19, 1987, 62-152980
Int. Cl.[5] H04N *1/23, 1/46*
U.S. Cl. 358—76 14 Claims



1. A method of making a color print from a color slide, comprising the steps of:

generating red, green and blue sets of positive image signals, together representing an image of the color slide, using a color TV camera;

displaying said sets of positive image signals as a positive color image on a color monitor;

determining if said color slide is invertedly mounted by monitoring the focus of the image on said color monitor, and, if out-of-focus, readjusting said color TV camera to focus on a back side of said color slide, and electronically converting said sets of positive image signals so as to display a mirror image of said positive color image on said color monitor;

converting said red, green and blue sets of positive image signals into respective negative image signals if said color slide is determined within said determining step to be properly mounted, and said red, green an d blue sets of positive image signals into negative mirror image signals if said color slide is determined within said determining step to be invertedly mounted;

sequentially displaying said negative image signals if said color slide is determined within said determined step to be properly mounted and said negative mirror image signals if said color slide is determined within said determining step to be invertedly mounted, as black-and-white negative image on a black-and-white CRT so as to expose a color photographic paper to said black-and-white negative images through respective red, green and blue filters, each sequentially inserted between said black-and-white CRT and said color photographic paper independently of the other two, thereby forming three monocolor latent images overlapping one another in said color photographic paper; and

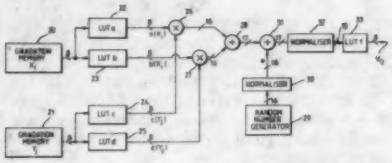
processing said exposed color photographic paper to provide a color print of said color slide.

4,930,010

APPARATUS FOR GENERATING A TWO-DIMENSIONAL COLOURED DISPLAY

Lindsay W. MacDonald, Bedfordshire, England, assignor to Crossfield Electronics Limited, London, England

Filed Dec. 27, 1988, Ser. No. 289,893
Claims priority, application United Kingdom, Jan. 11, 1988, 8800503
Int. Cl.[5] H04N *1/415*
U.S. Cl. 358—78 7 Claims



1. Apparatus for generating a two-dimensional coloured display in which there is a variation of colour across the display in a predetermined manner, the colour of each pixel in the display being defined by at least one colour components, the apparatus comprising, for each colour component, a memory for storing a pair of gradation curves (X(i), Y(i)) representing the variation in intensity of said colour component in orthogonal directions X, Y across said display; processing means for determining a resultant colour component value V(i,j) for a pixel to be displayed at a location (i,j) in said display in accordance with the following formula:

$$V(i,j)=f[a(X(i)b(Y(j))+c(X(i)d(Y(j))]$$

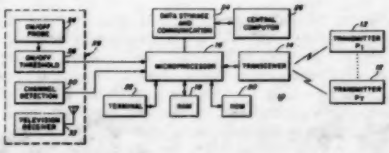
where the pixel has coordinates i,j and k is a normalizing constant, and where a, c, are functions of X(i), b, d are functions of Y(j) and f is an output function, said functions being chosen such that V(i,j) exhibits no discontinuities for all values of X(i), Y(j); and display means, responsive to said resultant colour component values V(i,j) for displaying a corresponding colour at a position in said display corresponding to that pixel.

4,930,011

METHOD AND APPARATUS FOR IDENTIFYING INDIVIDUAL MEMBERS OF A MARKETING AND VIEWING AUDIENCE

David A. Kiewit, Palm Harbor, Fla., assignor to A. C. Neilsen Company, Northbrook, Ill.

Filed Aug. 2, 1988, Ser. No. 227,187
Int. Cl.[5] H04H *9/00*
U.S. Cl. 358—84 19 Claims



14. A method for identifying predetermined individual members in a plurality of monitored areas comprising the steps of:

storing a plurality of predetermined identification signals, each of said predetermined identification signals corresponding to one of the predetermined individual members;

providing a transmitter device associated with each of the predetermined individual members for transmitting a unique predetermined identification signal;

providing a receiver device in each of said plurality of moni-

tored areas for receiving said transmitted identification signals, said plurality of monitored areas including at least one retail establishment monitored area and at least one television viewing monitored area;

comparing each of said received identification signals with said stored predetermined identification signals to identify each predetermined individual member; and

correlating each said identified predetermined individual member at different ones of the monitored areas.

4,930,012

CIRCUIT FOR DETECTING MOTION IN A VIDEO SIGNAL ON THE BASIS OF DETECTED CORRELATION PATTERNS

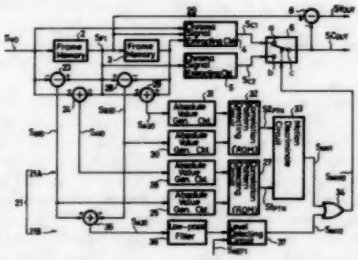
Tadao Fujita, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Sep. 21, 1989, Ser. No. 410,470

Claims priority, application Japan, Apr. 8, 1988, 63-87821

Int. Cl.[5] H04N 7/18

U.S. Cl. 358—105 **7 Claims**



1. A motion detecting circuit for detecting motion of a video signal, comprising:

serially-connected first and second frame memories for storing the video signal frame-by-frame;

means for producing first and second difference video signals respectively corresponding to the difference between input and output signals of said first frame memory and the difference between input and output signals of said second frame memory;

means for generating first and second absolute values in response to said first and second difference video signals, respectively;

means receiving said first and second absolute values and being responsive thereto for detecting first and second correlation patterns of said first and second difference video signals; and

means receiving the detected correlation patterns for discriminating motion of the video signal on the basis thereof.

4,930,013

PATTERN PROCESSING

Anthony R. Leaning, Ipswich, England, assignor to British Telecommunications public limited company, Great Britain

PCT No. PCT/GB87/00816, § 371 Date Sep. 2, 1988, § 102(e) Date Sep. 2, 1988, PCT Pub. No. WO88/04084, PCT Pub. Date Jun. 2, 1988

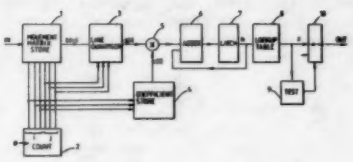
PCT Filed Nov. 17, 1987, Ser. No. 221,790

Claims priority, application United Kingdom, Nov. 20, 1986, 8627787

Int. Cl.[5] G06K 9/62; H04N 7/137

U.S. Cl. 358—133 **16 Claims**

1. An apparatus for classifying a set of values representing a two-dimensional pattern, comprising summation means for forming a weighted sum, modulo x, of those values, where x is an integer less than 2^p, p being the number of values in the set; and a store having x locations each containing a class identification word representing one of a set of standard patterns, the



address inputs of the store being connected to receive the output of the summation means.

4,930,014

METHOD AND APPARATUS FOR PROCESSING A STILL PICTURE SIGNAL

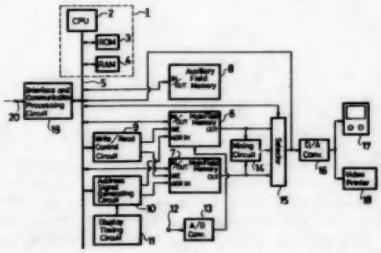
Satoru Maeda, Kanagawa; Yasushi Noguchi, Saitama; Kazunori Yasuda, and Shyunsuke Takano, both of Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed May 16, 1989, Ser. No. 352,487

Claims priority, application Japan, May 17, 1988, 63-120236

Int. Cl.[5] H04N 5/272

U.S. Cl. 358—209 **5 Claims**



1. A still picture signal processing apparatus for processing a still picture signal and for displaying a still picture according to a still picture signal comprising:

(a) still picture signal source means for generating a still picture signal;

(b) analog-to-digital converting means for converting said still picture signal into a digitized still picture signal;

(c) first and second main field memory means;

(d) auxiliary field memory means;

(e) signal processing means for processing a still picture signal;

(f) display means for displaying a still picture;

(g) means for supplying a signal selectively read out from said first and second main field memory means to said display means; and

(h) memory control means for controlling read and write operations of said first and second main field memory means and auxiliary field memory means, thereby a digitized still picture signal from said analog-to-digital converting means is supplied to said first main field memory means, said digitized still picture signal is read out from said first main field memory means, and is compressed by 1/n in data amount and is separated into first and second compressed signals by said signal processing means, said first and second compressed signals are supplied to said second main field memory means and auxiliary field memory means, respectively and written in portions of said second main field memory means and auxiliary field mem-

ory means, respectively, said second compressed signal is read out from said auxiliary field memory means and is supplied to said first main field memory means, and said first and second compressed signals are read out from said second and first main field memory means, combined and supplied to said display means.

4,930,015

FLAT TENSION MASK CATHODE RAY TUBE IMPLOSION SYSTEM

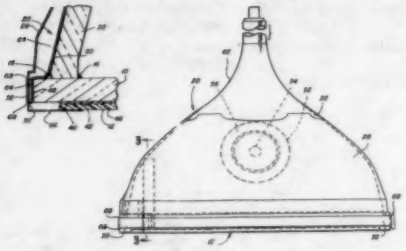
Lawrence W. Dougherty, Sleepy Hollow; Sae D. Lee, Buffalo Grove, and Melvin F. Rogers, Western Spring, all of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.

Continuation-in-part of Ser. No. 941,458, Dec. 15, 1986, and Ser. No. 894,984, Aug. 8, 1986. This application Apr. 6, 1988, Ser. No. 178,111

The portion of the term of this patent subsequent to Apr. 19, 2005, has been disclaimed.

Int. Cl.[5] H04N *5/65*

U.S. Cl. 358—246 **18 Claims**



1. A flat tension mask cathode ray tube comprising a brittle faceplate member, an implosion protection panel member, an adhesive system bonding said panel member to said faceplate member, and a tension band system around the periphery of said faceplate member which exerts compression on said faceplate member.

4,930,016

IMAGE SCANNING READING AND RECORDING SYSTEM

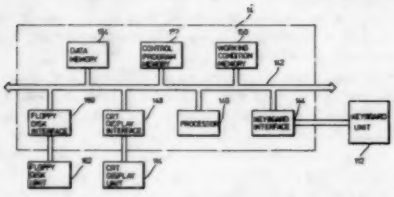
Hiromi Yuzawa; Masahiro Inoda, and Hideaki Kimura, all of Kanagawa, Japan, assignors to Fuji Photo Film, Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 39,195, Apr. 16, 1987, abandoned. This application Jul. 6, 1989, Ser. No. 376,186

Claims priority, application Japan, Apr. 16, 1986, 6187758

Int. Cl.[5] H04N *1/21*

U.S. Cl. 358—296 **11 Claims**



1. A system for reading and recording an image by scanning the same, comprising:

entry means for allowing, prior to scanning and recording processing of a plurality of respective single-sheet originals, entry, for each respective single-sheet original, of predetermined image recording conditions, and identifying information affixed in physical relation with the respective single-sheet original, and for associating said predetermined image recording conditions for each respective single-sheet original with its identifying information;

an image scanning reading and recording apparatus for

delivering selected ones of said single-sheet originals bearing an image and identifying information to a reading position,

scanning a selected one of said single-sheet originals with a first light beam to read the image to produce image information,

processing the image information according to said predetermined image recording conditions to produce an image signal,

modulating a second light beam with the image signal to produce a halftone dot signal, and

applying the halftone dot signal to a photosensitive medium to record the image thereon; and including

control unit means including primary memory means for storing data items used to produce the image signal, said control unit means being connectable to additional memory means for storing said predetermined image recording conditions in association with identifying information for each respective single-sheet original; and

original feeding mechanism means including means for successively feeding selected ones of said single-sheet originals to said image scanning reading and recording apparatus and identifying means for identifying each selected single-sheet original as it is fed based on identifying information located on said selected single-sheet original, said control unit means being arranged to select those of said predetermined image recording conditions stored in said additional memory means which correspond to said selected single-sheet original identified by said identifying means on the basis of said identifying information, and to effect the recording of the image on said photosensitive medium according to selected said predetermined image recording conditions.

4,930,017

COMMUNICATION TERMINAL DEVICE

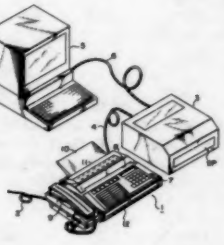
Shoji Izawa, Shizuoka, Japan, assignor to Tokyo Electric Co., Ltd., Tokyo, Japan

Filed Oct. 11, 1988, Ser. No. 256,767

Claims priority, application Japan, Oct. 19, 1987, 62-263144

Int. Cl.[5] H04N *1/32*

U.S. Cl. 358—296 **10 Claims**



1. A communication terminal device comprising:

a communication circuit for receiving information;

a built-in recording device for recording the received information on a specified recording medium;

a connector section to which an optional recording device is selectively connected;

selection means for selecting one of said recording devices;

control means connected to receive the information supplied from said communication circuit, for supplying the information to the recording device selected by said selection means; and

wherein said control means includes processing means for repeatedly checking the selected recording device, and for causing the information to be supplied to the other recording device when it is detected that the selected recording device is not accessible.

4,930,018

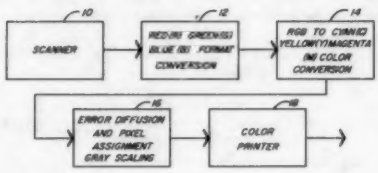
METHOD AND SYSTEM FOR ENHANCING THE QUALITY OF BOTH COLOR AND BLACK AND WHITE IMAGES PRODUCED BY INK JET PRINTERS

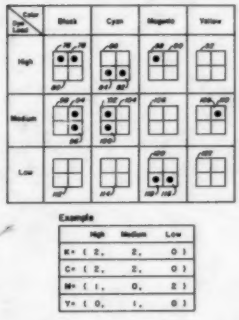
C. S. Chan; James G. Bearss, and Terry M. Nelson, all of Boise, Id., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Dec. 2, 1988, Ser. No. 278,881

Int. Cl.[5] **H04N** *1/034, 1/23;* **G01D** *15/16;* **B41J** *2/21*

U.S. Cl. 358—298 **37 Claims**





Example

	High	Medium	Low
K=	(2,	2,	0)
C=	(2,	2,	0)
M=	(1,	0,	2)
Y=	(0,	1,	0)

1. A method for decreasing color contrast in a printed image which includes:

a. generating cyan, yellow, magenta and black pixel information,

b. assigning said information a gray scale drop count number based upon a count of ink drops having a known dye loading and the dye loading thereof,

c. decrementing said drop count number to a lower level number on said gray scale in response to a measure of the available number of ink drops and the dye loading representative of cyan, yellow, magenta and black pixel information, and

d. ejecting a volume of ink into a selected print area which corresponds to said lower level number on said gray scale.

4,930,019

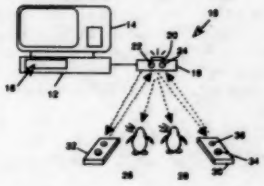
MULTIPLE-USER INTERACTIVE AUDIO/VIDEO APPARATUS WITH AUTOMATIC RESPONSE UNITS

Chi Wai Chu, 2-88 Ma Ling Path, House No. 28, Windsor Park, Kau Tau Shan, Shatin, N.T., Hong Kong

Filed Nov. 29, 1988, Ser. No. 277,548

Int. Cl.[5] **G09B** *5/04, 7/06;* **H04N** *5/93*

U.S. Cl. 358—335 **1 Claim**



1. A player-interactive audio/video apparatus usable with a video monitor and a video cassette player connectable to the monitor for displaying a video signal comprising:

an audio/video tape having an audio track and a video track, playable on the player and prerecorded with video display information on the video track for producing the video signal when played back on the player, said tape also being prerecorded with an audio signal on the audio track comprising a first voice signal associated with the video signal, a second voice signal not associated with the video signal, and three control signals, the two voice signals and three control signals being recorded with separate bandwidths of the audio track;

a control unit connectable to the player for receiving the audio signal when said tape is played on the player, said control unit comprising: a decoder for decoding the audio signal into separate voice signals and control signals; a first voice speaker responsive to the first voice signal for broadcasting the first voice signal; means for detecting a first of the control signals in the audio signal; first voice switch means disposed between said decoder means and said first voice speaker and controllable for selectively coupling the first voice signal to said first voice speaker; first transmitter means for transmitting the second voice signal and the second and third control signals remotely from said control unit; second voice switch means controllable for selectively coupling the second voice signal and the second and third control signals to said first transmitter means; means for generating a disabling signal distinct from the first, second and third control signals; third switch means controllable for selectively coupling the disabling-signal generating means to said first transmitter means; first receiver means for receiving an indicating signal remotely transmitted; detector means coupled between said first receiver means and said third switch means and responsive to a received indicating signal for operating said third switch means in a manner transmitting the disabling signal for a predetermined period of time when the indicating signal is received;

a plurality of automatic response units positionable remotely from said control unit, each comprising: a second receiver means for receiving the transmitted second voice signal and second and third control signals; a second speaker means for broadcasting said second voice signal; fourth switch means controllable for selectively connecting said second receiver means to said second speaker means; a detector means responsive to a predetermined one of the second and third control signals for operating said fourth switch means in a manner connecting said second receiver means to said second speaker means when the predetermined one of the control signals occurs; and

a plurality of manually operable indicator units positionable remotely from said control unit and said response units,

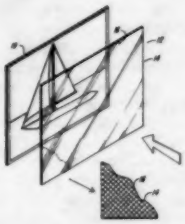
each indicator unit comprising: manually operable switch means; means for generating an indicating signal; indicator transmitter means for transmitting the indicator signal remotely of said indicator unit; first indicator switch means controllable for selectively coupling said indicator signal generating means to said indicator transmitter means; second indicator switch means controllable for selectively coupling said manual switch means to said first indicator switch means; and indicator receiver means responsive to a received disabling signal for controlling operation of said first indicator switch means in such a manner that said first indicator switch means is open when said disabling signal is received by said indicator receiver means, thereby preventing transmission of the indicating signal when said manual switch is operated.

4,930,020

FACSIMILE TRANSMISSION OF PHOTOGRAPHIC IMAGES

James F. Martin, 6914 Woodhaven Rd., NW., Roanoke, Va. 24019

Filed Dec. 29, 1986, Ser. No. 947,390
Int. Cl.[5] H04N *1/00*
U.S. Cl. 358—400 **10 Claims**



1. A method of preparing a photographic image for facsimile transmission comprising,

preparing a photocopy of said photographic image through a screen comprising a plurality of spaced dots on said screen in which one of the screen and dots are transparent and the other opaque to light transmission, whereby the photocopy has reproduced thereon said photographic image and the pattern of said dots with either said dots or the spaces therebetween forming the image of said photographic image and wherein said screen is a transparent flexible sheet between about 0.001 and 0.016 inches in thickness, and said dots are white or yellow dots dispersed at even intervals over a surface of said sheet, the density of said dots being between 48 and 52 lines per inch and the overall gray tone of said sheet being between 15 and 30 percent.

4,930,021

PROCESS AND APPARATUS FOR REDUCING A PICTURE WITH FINE LINE DISAPPEARANCE PREVENTION

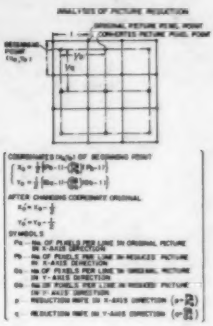
Yoshiyuki Okada, Isehara, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Mar. 20, 1989, Ser. No. 325,912
Claims priority, application Japan, Mar. 18, 1988, 63-063802; Aug. 30, 1988, 63-213673
Int. Cl.[5] H04N *1/393*
U.S. Cl. 358—451 **13 Claims**

1. A process for reducing a picture by determining monochrome data of converted picture pixels based on monochrome data of original picture pixels, and for avoiding disappearance of fine lines from the converted picture,

said process comprising the steps of:

(a) successively receiving monochrome data of original picture pixels in the vicinity of a converted picture pixel;
(b) generating data of a line susceptible to disappearance;
(c) discriminating a divisional region in which said converted picture pixel is located;



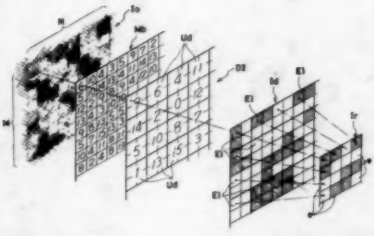
(d) calculating, according to logic calculations, monochrome data of said converted picture pixel based on said generated data, said discriminated divisional region, and said monochrome data of original picture pixels; and
(e) producing a signal indicating said monochrome data of said converted picture pixel according to said calculation.

4,930,022

METHOD AND DEVICE FOR IMAGE REDUCTION IN IMAGE PROCESSING

Mineo Kubota, Kofu, Japan, assignor to Nippon Seimitsu Kogyo Kabushiki Kaisha, Kofu, Japan

Filed Dec. 8, 1988, Ser. No. 281,329
Claims priority, application Japan, Jun. 2, 1988, 63-136221
Int. Cl.[5] H04N *1/40*
U.S. Cl. 358—451 **5 Claims**



3. A device for image processing capable of reducing a read-out image obtained in a matrix by digitizing a given original image in accordance with a predetermined n×n dither pattern, comprising:

a subscanning encoder for outputting a subscanning encoder pulse each time updating of subscanning;

a timing pulse generator for outputting regularly timing pulses;

a dither setting circuit having the dither pattern with dither element values with which picture elements constituting the matrix of said read-out image are compared to obtain an intermediate dither image;

a mode selection circuit for selecting one of at least equality and reducing modes;

a scanning control circuit for outputting said dither element values so that when said mode selection circuit selects the image reducing mode at a 1/m reduction rate, one dither

element value is delivered each time m-subscanning encoder pulses from said subscanning encoder or m-timing pulses from said timing pulse generator are outputted so as to derive an mn×mn dither pattern composed of n×n dither element values defined in a matrix from said n×n dither matrix pattern;

a dither matrix resistance circuit having a plurality of resistors for obtaining said intermediate dither image; and

a dither decision circuit for selecting said resistors of said dither matrix resistance circuit in accordance with the dither pattern,

whereby a reduced image represented by said brightness features corresponding to said original image is obtained by comparing brightness of each pixel of said read-out image with said dither element values prescribed in said mn×mn dither pattern at a pixel corresponding to that of said read-out image to obtain said intermediate dither image having a plurality of unit matrices and extracting brightness features of the respective unit matrices in said intermediate dither image.

4,930,023

HALFTONE DOT GENERATOR USING GRAINED SCREEN PATTERNS

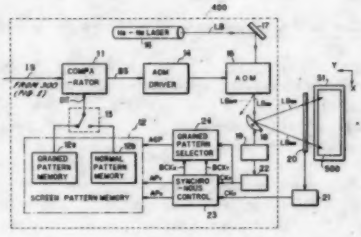
Kazunori Yakame, Kyoto, Japan, assignor to Dainippon Screen Mfg. Co. Ltd., Japan

Filed Feb. 27, 1989, Ser. No. 315,907

Claims priority, application Japan, Mar. 1, 1988, 63-49343

Int. Cl.[5] H04N *1/40*

U.S. Cl. 358—460 **12 Claims**



1. A method of producing a halftone dot image on the basis of original image data expressing an original image, comprising the steps of:

(a) preparing grained screen patterns that are different from each other;

(b) arranging said grained screen patterns in a random order, so as to obtain a random arrangement of said grained screen patterns;

(c) comparing said original image data with said random arrangement of said grained screen patterns for each pixel and thereby generating a halftone dot signal; and

(d) producing a halftone dot image on the basis of said halftone dot signal.

4,930,024

VARIABLE SPEED MAGNETIC MEDIUM RECORDING AND PLAYBACK APPARATUS

Shuhei Kanda; Mitugu Hirota, and Teruo Narushima, all of Fukaya, Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Mar. 25, 1987, Ser. No. 29,820

Claims priority, application Japan, Mar. 26, 1986, 61-65862; Mar. 26, 1986, 61-65863

Int. Cl.[5] H04N *5/783*

U.S. Cl. 360—10.1 **12 Claims**

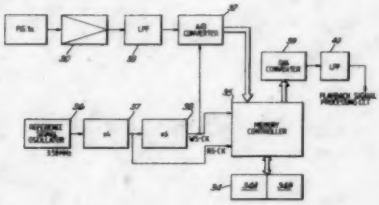
1. A magnetic reproducing apparatus for reproducing signals prerecorded in defined tracks on a magnetic recording medium, said apparatus comprising:

mode selection means for selecting between a normal mode and another mode;

variable speed rotary head means for helically scanning the prerecorded signals on the recording medium to produce an output signal, said rotary head means rotating at a first speed during the normal mode;

variable speed drive means for selectively moving the recording medium relative to said rotary head means, said drive means moving said recording medium at a second speed during the normal mode; and

speed control means operatively coupled to and responsive to said mode selection means for controlling the speed of said rotary head means in correspondence with the speed of said drive means, said speed control means causing said rotary head means to rotate at a third speed equal to a predetermined rotary head constant times the first speed and causing said drive means to move said recording medium at a fourth speed equal to a predetermined drive constant times the second speed during the other mode, the rotary head constant and the drive constant having



values other than zero and one and differing from one another;

storage means operatively coupled to said rotary head means and including at least three storage elements for storing the output signal;

clock means for generating a write clock signal and a read clock signal;

storage control means operatively coupled to said storage means and to said clock means for sequentially writing selected portions of the output signal to each of said storage elements except a selected one of said storage elements at a first rate in accordance with the write clock signal during a first time period, for reading the selected portions of the output signal from the selected one of said storage elements at a second rate different from the first rate in accordance with the read clock signal during the first time period, and for sequentially reading the selected portions of the output signal from each of said storage elements except the selected one of said storage elements at the second rate in accordance with the read clock signal during a second time period different from the first time period, said storage control means sequentially selecting each of said storage elements as the selected one.

4,930,025

ARRANGEMENT FOR INDICATING ANGULAR POSITION OF HEADWHEEL DISK IN A TAPE RECORDER

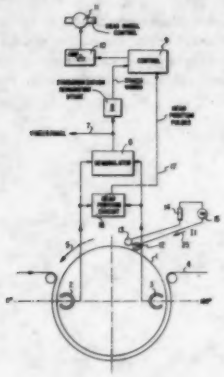
Günter Oberjatzas, Barsinghausen, and Heinz-Werner Koesen, Hannover, both of Fed. Rep. of Germany, assignors to Deutsche Thomson Brandt GmbH, Villingen-Schwenningen, Fed. Rep. of Germany

Continuation of Ser. No. 019,079, Feb. 26, 1987, abandoned. This application Jan. 17, 1989, Ser. No. 298,203

Claims priority, application Fed. Rep. of Germany, Feb. 26, 1986, 3606091

Int. Cl.[5] G11B *15/14, 21/02*

U.S. Cl. 360—64 12 Claims



1. In a device for transferring signals between itself and a record carrier tape, including a rotating head wheel disk having an axis of rotation and mounted for movement along said axis, and at least one head disposed on said rotating head wheel disk for cooperating with a record carrier tape; the improvement comprising

means for detecting the angular position and the linear position along said axis of said head wheel disk during rotation thereof, said means for detecting comprising sensor means disposed on said rotating head wheel disk, and signal emitter means for producing signals in said sensor means indicating the angular position and the linear position along said axis of rotation of the head wheel disk, with said signal emitter means including:

a first elongated conductor loop positioned adjacent said head wheel disk with the elongate axis of said loop oriented generally parallel to said axis of rotation,

a second elongated conductor loop positioned adjacent said head wheel disk with the elongate axis of said second loop forming an acute angle with the elongate axis of said first loop, and such that said sensor means passes said first and second conductor loops successively during rotation of said head wheel disk, and

means for producing a current in each of said first and second loops, whereby the signal produced in said sensor means by one of said loops is an indication of the angular position, and the relative time between the signals produced in said sensor means by said first and second loops is an indication of the linear position of said head wheel disk.

4,930,026

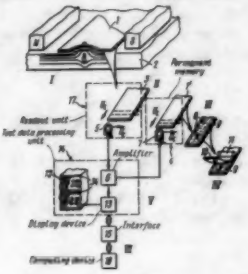
FLAW DETECTOR FOR MAGNETOGRAPHIC QUALITY INSPECTION

Vladimir V. Kljuev, 3 Frunzenskava ulitsa, 14, kv. 5., Moscow; Valery S. Kozlov, Leninsky prospekt, 16, kv. 76., Minsk; Dmitry B. Volodchenko, ulitsa Novovilenskaya, 3, kv. 32., Minsk; Alexandr V. Stepanenko, ulitsa Surganova, 40, kv. 25., Minsk; Vladimir I. Baranovsky, ulitsa Minskaya, 105, kv. 4.; Mikhail I. Korolkov, ulitsa Ryabinovaya, 27., both of Bobruisk, and Orest S. Semenov, ulitsa Verkhnyaya Pervomaiskaya, 53/35, korpus 3, kv. 27., Moscow, all of U.S.S.R.

Division of Ser. No. 919,879, Oct. 16, 1986. This application Mar. 21, 1988, Ser. No. 170,851

Int. Cl.[5] G11B *5/02;* G01N *27/82*

U.S. Cl. 360—67 7 Claims



1. A flaw detector for magnetographic quality inspection, comprising:

a readout unit having:

a drum with a cylindrical surface adapted to rotate about a shaft thereof;

a magnetosensitive transducer disposed on the cylindrical surface of said drum;

a modulation disk featuring holes arranged along the perimeter thereof and installed on the shaft of said drum;

a sensor of lines, installed in the immediate vicinity of said holes of said modulation disk;

a mechanism for driving a magnetogram and said drum with said magnetosensitive transducer;

a test data processing unit having:

an amplifier whose input is connected to said magnetosensitive transducer;

a display device having at least five inputs and three outputs, the first said input being connected to an output of said amplifier, the second said input being connected to said line sensor;

a permanent memory comprising:

a magnetic medium disposed in said mechanism for driving said magnetogram and magnetosensitive transducer;

at least one recording magnetic head electrically coupled to said amplifier.

4,930,027

METHOD AND APPARATUS FOR TAPE SPEED OVERRIDE OPERATION WHEN RECOVERING HELICAL AUDIO

Robert B. Steele, Menlo Park, and Leonard A. Pasdera, San Carlos, both of Calif., assignors to Ampex Corporation, Redwood City, Calif.

Filed Nov. 23, 1988, Ser. No. 275,257

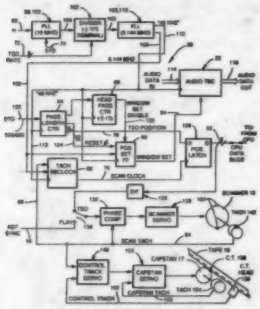
Int. Cl.[5] G11B *15/473;* H04N *5/783*

U.S. Cl. 360—70 21 Claims

15. A circuit for effecting tape speed override in a video tape recorder having a helical scanner with a controllable scan

tracking head for recovering helical audio data from a recorded tape, comprising;

means for providing a variable audio clock indicative of a desired rate of tape speed override; and



means responsive to the variable audio clock for moving the recorded tape at a speed commensurate with the desired rate while maintaining a selected phase relationship between the tape and scanner which prevents the scan tracking head from jumping between tracks to provide the faithful recovery of the helical audio data.

4,930,028

TAPE RECORDER

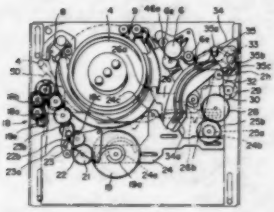
Noritaka Kunimaru; Katsuhiro Shiba; Norio Kudo; Gen Inoshita, and Shogo Sato, all of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Division of Ser. No. 166,595, Mar. 10, 1988. This application Apr. 27, 1989, Ser. No. 343,709

Claims priority, application Japan, Mar. 11, 1987, 62-35351[U]; Mar. 11, 1987, 62-35357[U]; Mar. 11, 1987, 62-35359[U]; Mar. 13, 1987, 62-35978[U]

Int. Cl.[5] G11B *15/66, 5/08*

U.S. Cl. 360—85 **1 Claim**



1. A tape draw-out mechanism in a tape recorder which mounts a tape cassette thereon, said tape recorder including a rotary drum having a magnetic head, a tape drawn-out from said tape cassette being wound on said rotary drum by a certain amount for recording and reproduction with said tape, the position of said drum being offset in the width direction of said tape from the position of said tape cassette; said tape draw-out mechanism, comprising:

first and second guide members adapted to be movable along an outer periphery of said rotary drum, each of said guide members having a tape draw-out pin for drawing out said tape from said tape cassette; and

a third guide member movably disposed in said tape recorder for drawing out the tape from said cassette prior to the drawing out the tape by said first and second guide members, said third guide member having a first tape draw-out pin which changes the position of said tape in said width direction of said tape from said drum position to said tape cassette position, and said third guide member also having a second tape draw-out pin for directing said tape subjected to positional change by said first pin to a direction parallel to the tape cassette, wherein the distance between a terminal end position of said tape wound around said drum to said tape draw-out pins resulting in a compact recorder.

4,930,029

MAGNETIC DISK APPARATUS

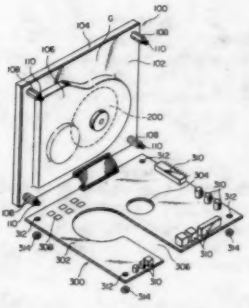
Isao Morita, Akishima, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Jul. 8, 1988, Ser. No. 216,582

Claims priority, application Japan, Jul. 10, 1987, 62-106017[U]

Int. Cl.[5] G11B *5/012*

U.S. Cl. 360—97.01 **5 Claims**



1. A magnetic disk apparatus, comprising:

a base plate having a first surface and a second surface opposite said first surface, said base plate having an indentation therein, said indentation being concave on said first surface and convex on said second surface, and defining an inset area on said second surface about the circumference of said indentation;

a mechanical portion having a magnetic disk assembly and a magnetic head assembly mounted on said first surface in said indentation;

a cover for covering at least said mechanical portion, said cover mounted on said first surface of said base plate;

a printed circuit board having a plurality of taller and shorter electrical parts disposed thereon, said printed circuit board being mounted on said second surface of said base plate, said taller electrical parts being arranged to protrude into said inset area of said base plate.

4,930,030

SIGNAL RECORDING/REPRODUCING DEVICE

Atsuhiro Yabu, and Toshiro Tsukahara, both of Nagaokakyo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 8, 1988, Ser. No. 229,410

Claims priority, application Japan, Aug. 6, 1987, 62-198468

Int. Cl.[5] G11B *5/588*

U.S. Cl. 360—107 **7 Claims**

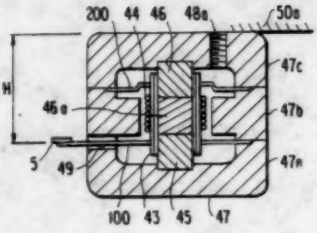
1. A signal recording/reproducing device, comprising:

(a) a rotary drum (3),

(b) a magnetic tape (13) wrapped obliquely around an outer peripheral surface of the drum,

(c) a drive unit (4a) mounted to the drum for rotation therewith and including a yoke assembly (47), a bobbin (43) disposed proximate the yoke assembly, first and second spaced, parallel spring plates (100, 200) mounting the

bobbin to the yoke assembly, a magnetic r/w head (5) mounted to the first spring plate and disposed in engagement with the tape, and a coil (44) wound around the bobbin for axially deflecting the bobbin and thus the spring plates and magnetic head in response to an automatic tracking speed compensation signal applied thereto, and



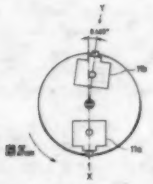
(d) means for preventing tracking errors caused by thermally induced axial elongations of the bobbin, said preventing means being characterized by the first spring plate having a larger spring constant than the second spring plate such that axial bobbin elongations are primarily absorbed by the deflection of the second spring plate.

4,930,031

APPARATUS FOR RECORDING AND REPRODUCING DIGITAL SIGNALS USING A HELICAL SCAN

Shinichi Nagahara; Tomoyuki Suzuki; Tomoyasu Yamada; Tokihiro Takahashi, and Ichiro Miyake, all of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Nov. 14, 1988, Ser. No. 270,336
Claims priority, application Japan, Feb. 26, 1988, 63-42272; Mar. 4, 1988, 63-51305; Mar. 4, 1988, 63-51306
Int. Cl.[5] G11B *5/52, 21/18*
U.S. Cl. 360—107 3 Claims



1. An apparatus for recording and reproducing digital signals using a helical scan, comprising: a rotary drum; and two heads mounted on said drum at the same height in opposition to each other, a product of the diameter D of said drum and a wrap-around angle of a storage medium with respect to said rotary drum being constant while a rotational speed of said drum is increased to a rotational speed N times higher than a predetermined rotational speed, one of said two heads being mounted higher than the other by a distance of $(1-1/N)P$ to provide a step, and the other head being mounted at a position an angle behind a position at which the other head directly opposes the one of the heads, said angle being defined by the following equation:

$$\frac{(1-1/N)P}{\tan\Theta}\cdot\frac{C}{L\cdot D}$$

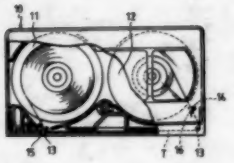
where L is a track length in a tape format obtained when said rotary drum rotates at said predetermined rotational speed, Θ is a track angle, P is a track pitch, and C is a constant dependent on said drum diameter D and said wrap-around angle.

4,930,032

MAGNETIC TAPE CASSETTE HAVING IMPROVED GUIDE POLE STRUCTURE

Takahito Miyoshi; Minoru Kanazawa; Tsutomu Sugisaki; Takuzi Yamada, and Yasutoshi Okuzawa, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jun. 13, 1988, Ser. No. 205,759
Claims priority, application Japan, Jun. 15, 1987, 62-90717[U]; Jun. 26, 1987, 62-97437[U]
Int. Cl.[5] G11B *23/02*
U.S. Cl. 360—132 5 Claims



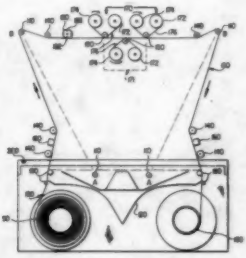
1. In a magnetic tape cassette containing a magnetic tape and having a metal guide pole which guides said magnetic tape while in sliding contact with a magnetic surface of said tape, the improvement wherein inorganic particles having a Moh's hardness of 9 or higher from pat of a surface of said guide pole in sliding contact with said magnetic surface of said tape.

4,930,033

TAPE CLEANER AND DEGAUSSER APPARATUS

Gregory Pergerson, Woodbridge, Va., assignor to E-Systems, Inc., Dallas, Tex.

Filed Aug. 5, 1988, Ser. No. 228,686
Int. Cl.[5] G11B *5/00*
U.S. Cl. 360—137 6 Claims



1. A tape cleaner and degausser apparatus for cleaning, conditioning and degaussing magnetic video tape comprising:
a wiper means for wiping the front and back of the surfaces of a video tape;
a scrapping means engaging the front surface of the video tape for removing debris and oxide therefrom;
a degaussing means for demagnetizing the video tape;
means for moving the video tape past the wiper means, scrapping means and degaussing means;
a front panel having a plurality of touch pad controls for controlling and managing the operation of the apparatus;
a bar condition station on the front panel containing a plurality of LED displays for providing information on the status of the scrapping means; and
a clear dust cover hinged to the rear top half of the apparatus providing easy access to the internal mechanism of the

apparatus for replacing of the wiping and scrapping means.

4,930,034

PROTECTIVE CIRCUIT FOR A POWER PACK FOR EXCITATION OR DE-EXCITATION OF A SUPERCONDUCTION COIL SYSTEM

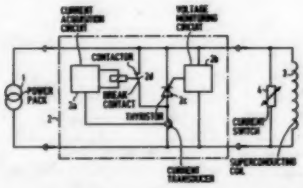
Bernd Kusserow, Erlangen; Klaus Gagneur, Baiersdorf, and Siegfried Hofler, Buckenhof, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jul. 12, 1988, Ser. No. 217,970

Claims priority, application Fed. Rep. of Germany, Jul. 13, 1987, 3723127

Int. Cl.[5] H02H *7/20*

U.S. Cl. 361—19 6 Claims



1. A protective circuit comprising:

means, adapted for connection across a power pack means for generating a supply voltage having a polarity at an output for exciting or deexciting a superconducting coil system, for monitoring a voltage across said output of the power pack means;

a switch connected in parallel to the output of said power pack means and being conductive, when closed, at least in a direction opposite to said polarity of said supply voltage; and

means, responsive to said means for monitoring, for closing said switch when said voltage across said output of said power pack means exceeds a predetermined value in a direction opposite said supply voltage of said power pack means so that current previously flowing in said superconducting coil is conducted through said switch.

4,930,035

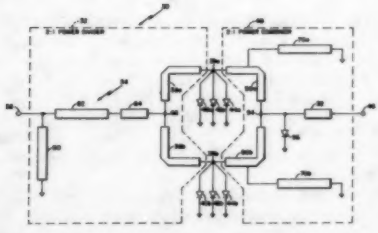
RADIO FREQUENCY LIMITER CIRCUIT

Luis M. Viana, Melrose; Robert A. Cuozzo, North Andover; Michael L. Miceli, Hingham, and Kent A. Whitney, Lunenburg, all of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Apr. 3, 1989, Ser. No. 333,070

Int. Cl.[5] H04B *15/00*

U.S. Cl. 361—54 5 Claims



1. A radio frequency limiter circuit, comprising:

(a) a radio frequency power divider having an input and a plurality of outputs;

(b) a corresponding plurality of diodes, with each one of said diodes having a first electrode connected to a corresponding one of the plurality of outputs of the power divider and a second electrode connected to a reference potential; and

(c) a power combiner, having an output and a plurality of inputs, each one of such inputs being connected to a corresponding one of the outputs of the power divider.

4,930,036

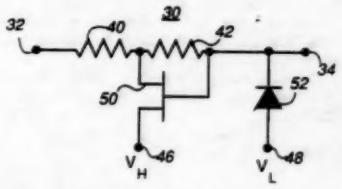
ELECTROSTATIC DISCHARGE PROTECTION CIRCUIT FOR AN INTEGRATED CIRCUIT

John E. Sitch, Ottawa, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Jul. 13, 1989, Ser. No. 379,126

Int. Cl.[5] H02H *9/04*

U.S. Cl. 361—56 23 Claims



1. An electrostatic discharge protection circuit for a GaAs integrated circuit, comprising:

a first terminal;

second and third terminals for receiving respective high and low level supply voltages;

a transistor having a control electrode and a bidirectionally conductive controlled path coupled between the first terminal and the second terminal;

resistance means coupled between the control electrode and the first terminal for rendering the transistor conductive in a first direction in response to an electrostatic discharge potential of a first polarity at the first terminal;

diode means coupled between the control electrode and the third terminal for rendering the transistor conductive in a second direction in response to an electrostatic discharge potential of a second polarity at the first terminal, the second polarity being opposite to the first polarity; and

means for coupling a terminal of a GaAs integrated circuit to the resistance means.

4,930,037

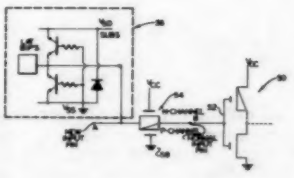
INPUT VOLTAGE PROTECTION SYSTEM

Ann K. Woo, Cupertino, Calif., assignor to Advaced Micro Devices, Inc., Sunnyvale, Calif.

Filed Feb. 16, 1989, Ser. No. 311,270

Int. Cl.[5] H02H *3/20*

U.S. Cl. 361—58 8 Claims



1. A static electricity protection system for use with a voltage sensitive MOS component having a gate input with predetermined oxide layer thickness, the protection system comprising:

(a) a MOS component having a gate input; and

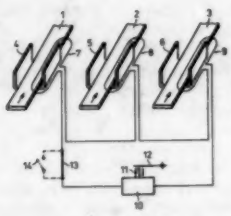
(b) a transmission gate having a source and a drain as an input and output, respectively, said transmission gate being connected to said MOS component gate input and having a higher voltage capacity than said MOS component for absorbing and for protecting said MOS component from sudden electrical voltage surge discharges.

4,930,038

CURRENT OVERLOAD TRIPPING DEVICE WITH LEADING TRIPPING ACTION

Bernhard Pfeiffer, Berlin, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Jun. 28, 1988, Ser. No. 212,589
Claims priority, application Fed. Rep. of Germany, Jun. 29, 1987, 3721848
Int. Cl.[5] G11B *15/68*
U.S. Cl. 361—92 3 Claims



1. In a current overload tripping device having a time-delayed leading tripping action during uneven loading of the phases of a multiphase circuit, said tripping device including a transformer current pickup for each phase of the multiphase circuit, which current pickup members are connected in series with each other and with an electromechanical converter, an improvement wherein each of the current pickup members comprises a winding surrounding a magnet yoke of an electromagnetic tripping device of each phase and said electromechanical converter comprises a temperature/time-dependent device operating to provide a time-delayed tripping signal.

4,930,039

FAIL-SAFE SURGE ARRESTER

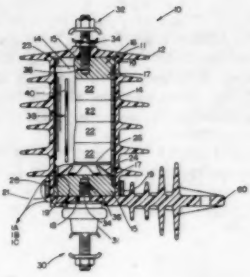
Jonathan J. Woodworth, Portville; Stephen P. Johnson, Olean; David R. Miller, Allegany; Jeffrey J. Kester, Olean, and Stanley S. Kershaw, Jr., Portville, all of N.Y., assignors to Cooper Industries, Inc., Houston, Tex.

Filed Apr. 18, 1989, Ser. No. 339,577
Int. Cl.[5] H02H *7/04*
U.S. Cl. 361—127 52 Claims

43. A surge arrester comprising:

a plurality of nonlinear resistive elements;

an insulative module having side walls for retaining said resistive elements in a stacked relationship; and



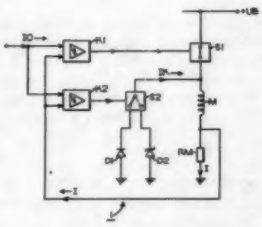
means spaced along the periphery of said module for radially venting gas through said side walls of said module.

4,930,040

CURRENT REGULATOR FOR INDUCTIVE LOADS

Jürgen Binarsch, Haste; Jürgen Bode, Hildesheim; Lutz Danne, Ronnenberg, and Norbert Lissel, Seelze, all of Fed. Rep. of Germany, assignors to WABCO Westinghouse Fahrzeugbremsen GmbH, Hanover, Fed. Rep. of Germany

Filed Nov. 14, 1988, Ser. No. 270,993
Claims priority, application Fed. Rep. of Germany, Dec. 10, 1987, 3741765
Int. Cl.[5] H01H *47/32*
U.S. Cl. 361—154 10 Claims



6. The current controller, as defined in claim 1, wherein a precision resistor is connected in series with said electromagnetic coil.

4,930,041

POTENTIOMETER POSITION SWITCH CIRCUIT

Peter P. Elderton, Fountain Valley; Richard P. Granada, West Covina, and Royal E. Howes, Anaheim, all of Calif., assignors to ITT Corporation, New York, N.Y.

Filed Dec. 8, 1988, Ser. No. 282,365
Int. Cl.[5] H02H *5/00*
U.S. Cl. 361—190 5 Claims

1. A potentiometer position switch circuit comprising a meter mechanism,

a low friction potentiometer coupled to move with said meter mechanism and having input terminals and output terminals,

a set point potentiometer having input and output terminals,

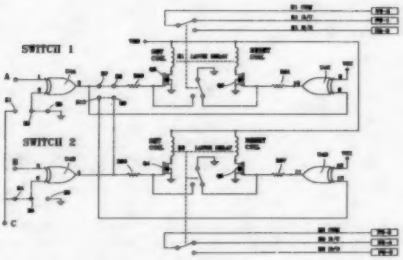
a first source of voltage, means connecting said first source across the input terminals of said low friction and set point potentiometers,

a voltage comparator having input terminals and an output terminal,

means connecting the output of said low friction potentiometer to one input terminal of said comparator and the output of said set point potentiometer to the other input terminal of said comparator,

a magnetic latching double pole, double throw relay having set and reset relay coils,

means connecting the output of said comparator to the gate of a first voltage operated transistor through sufficient resistors to minimize current drain and through an inverter to the gate of a second voltage operated transistor through sufficient resistance to minimize current drain,



the output of said first transistor being connected from a second voltage source through said set relay coil to ground and the output of said second transistor being connected from said second voltage source through said reset relay coil to ground,

one set of contacts on said relay being connected to ground the gate on said second transistor when the voltage on the gate on said first transistor is high and to ground the gate on said first transistor when the gate on said second transistor goes high and the other set of contacts being connected to actuate a utilization circuit in one or the other positions.

4,930,042

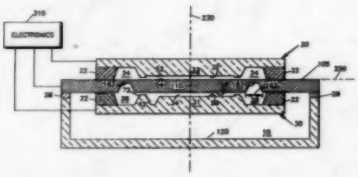
CAPACITIVE ACCELEROMETER WITH SEPARABLE DAMPING AND SENSITIVITY

Walter J. Wiegand, Glastonbury; James L. Swindal, East Hampton; Richard E. Swarts, Simsbury; Robert H. Bullis, Avon; Mario T. Lopiccolo, Southington; Daniel H. Grantham, and Arthur G. Foyt, both of Glastonbury, all of Conn., assignors to United Technologies, Hartford, Conn.

Filed Feb. 28, 1989, Ser. No. 317,240

Int. Cl.[5] H01G *7/00*; G01P *15/08*

U.S. Cl. 361—280 **16 Claims**



1. A solid-state accelerometer comprising:

a three-plate capacitor including fixed top and bottom plates and a movable sensing plate having a top surface separated from said top plate by a top gap and a bottom surface separated from said bottom plate by a bottom gap, defining a reference plane symmetrically disposed between said top and bottom surfaces, and being connected to support members by flexible connections extending across a support gap between said reference plate and said support members to move between said top and bottom plates in response to acceleration along an acceleration axis perpendicular to said reference plane, whereby acceleration along said acceleration axis displaces said sensing plate from said reference plane and alters the capacitance between said sensing plate and said top and bottom plates, in which;

said top and bottom plates and said support members are bonded together to form a rigid structure;

said sensing plate is connected to said support members by at least two flexures extending a predetermined hinge length along opposite sides of said sensing plate and having a predetermined hinge thickness less than the length of said sensing plate, so that a communication path is established between a top chamber between said top plate and said sensing plate and a bottom chamber between said bottom plate and said sensing plate; and

at least one chamber has motion stops disposed therein and grooves to facilitate squeeze-film damping in one of said sensing plate and said fixed plate, characterized in that:

a first side set of hinges are positioned along a first pair of sides of said sensing plate, have a predetermined total stiffness along each of said first pair of sides and are symmetric about a first plane defined by said acceleration axis and a first axis passing through said first pair of sides perpendicular to said first pair of sides and to said acceleration axis, said first side set of hinges also being symmetric about a second plane defined by said acceleration axis and a second axis passing through said acceleration axis perpendicular to said first axis;

a second side set of hinges are positioned along a second pair of sides, have said predetermined total stiffness along each of said second pair of sides, and are symmetric about said second and first planes in the same manner as said first side set of hinges are symmetric about said first and second planes, respectively; and

said first and second side sets of hinges are symmetrically disposed about a pair of diagonal planes perpendicular to said reference plane and having an angle of 45 degrees with respect to said first and second planes.

4,930,043

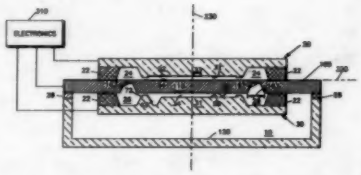
CLOSED-LOOP CAPACITIVE ACCELEROMETER WITH SPRING CONSTRAINT

Walter J. Wiegand, Glastonbury, Conn., assignor to United Technologies, Hartford, Conn.

Filed Feb. 28, 1989, Ser. No. 317,238

Int. Cl.[5] G01P *15/02*; H01G *7/00*

U.S. Cl. 361—283 **3 Claims**



1. A solid-state accelerometer for closed-loop operation to measure acceleration up to a predetermined maximum acceleration comprising:

a three-plate capacitor including fixed top and bottom plates and a movable sensing plate having a predetermined proof mass having a top surface separated from said top plate by a top gap and a bottom surface separated from said bottom plate by a bottom gap, defining a reference plane symmetrically disposed between said top and bottom surfaces and also defining top and bottom capacitors, and being connected to support members by flexible connections ex-

tending across a support gap between said reference plate and said support members to move between said top and bottom plates in response to acceleration along an acceleration axis perpendicular to said reference plane, whereby acceleration along said acceleration axis displaces said sensing plate from said reference plane and alters the capacitance in said top and bottom capacitors, in which;

said top and bottom plates and said support members are bonded together to form a rigid structure;

said sensing plate is connected to said support members by at least two flexures extending a predetermined hinge length, less than the length of said sensing plate, along opposite sides of said sensing plate and having a predetermined hinge thickness to determine a total spring constant, whereby that a communication path is established between a top chamber between said top plate and said sensing plate and a bottom chamber between said bottom plate and said sensing plate;

at least one of said top and bottom chambers has motion stops disposed therein whereby said sensing plate may be displaced from said reference plane by less than a predetermined maximum displacement along said acceleration axis; and

electronics means for sensing displacement of said sensing plate from said reference plane and applying voltage to said three-plate capacitor to restore said sensing plate to said reference plane, characterized in that:

G_{max} said maximum acceleration to be measured, and G_{bottom}, the acceleration that will cause the sensing plate to contact said motion stops, are related by the condition $G_{bottom}/4 < G_{max} < 4G_{bottom}$, G_{bottom} being a function of said total spring constant of said flexible connections, whereby said maximum acceleration to be measured is limited by said total spring constant.

4,930,044

THIN-FILM CAPACITOR AND METHOD OF MANUFACTURING A HYBRID MICROWAVE INTEGRATED CIRCUIT

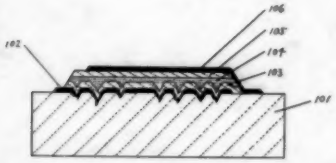
Kazuo Eda, Nara; Tetsuji Miwa, Neyagawa, and Yutaka Taguchi, Kadoma, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Aug. 25, 1989, Ser. No. 398,731

Claims priority, application Japan, Aug. 25, 1988, 63-211005; Mar. 31, 1989, 1-83401

Int. Cl.[5] H01G 4/06, 7/00

U.S. Cl. 361—313 **12 Claims**



1. A thin-film capacitor formed on a polycrystalline sintered body substrate and comprising a lower electrode, a dielectric film and an upper electrode, said dielectric film having a three layered structure comprising a first silicon oxide film formed by a chemical vapor-phase deposition method, a second silicon oxide film formed by coating on the first silicon oxide film a solution state silicon oxide precursor followed by denaturing by heat treatment, and a third silicon oxide film formed on the second silicon oxide film by a chemical vapor-phase deposition method.

4,930,045

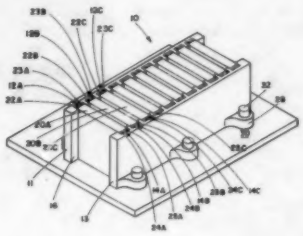
HIGH POWER, HIGH TEMPERATURE DISASSEMBLABLE CERAMIC CAPACITOR MOUNT

William E. Carlson, Rockford, and Mark W. Metzler, Davis, both of Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Oct. 26, 1989, Ser. No. 428,272

Int. Cl.[5] H05K 7/20; H01B 7/00

U.S. Cl. 361—329 **17 Claims**



1. A disassemblable capacitor mount having in combination a plurality of rigid capacitors disposed between fixed, spaced-apart conductors, said capacitors having opposed electrode ends, said electrode ends disposed within spaced-apart lateral slots on facing planar sides of said conductors;

thermal expansion-absorbing contacts including compressible, electrically conductive means for relieving stress disposed within said slots between said electrode ends and said planar sides to provide a resilient biasing force against said electrode ends and said conductors, said stress caused by thermal expansion of said capacitors during operation, said slots spacing said capacitors apart to allow dissipation of heat in said capacitors generated during operation.

4,930,046

APPARATUS BY WHICH AUXILIARY SLIDE-IN UNITS ARE CONNECTED TO SLIDE-IN UNITS

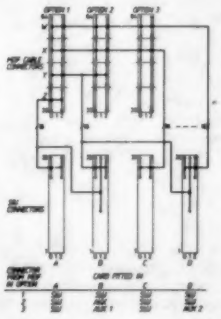
Raymond D. Smith, Reading, and Robert Marles, Berkshire, both of England, assignors to GEC Plessey Telecommunications Limited, England

Filed Oct. 20, 1988, Ser. No. 260,270

Claims priority, application United Kingdom, Oct. 20, 1987, 8724523

Int. Cl.[5] H05K 1/14

U.S. Cl. 361—393 **6 Claims**



1. Apparatus by which auxiliary subscriber slide-in units are connected to subscriber slide-in units, wherein a plurality of subscriber slide-in unit connectors are provided for receiving

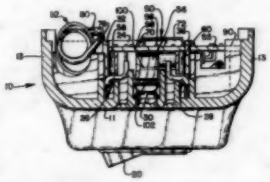
the subscriber slide-in units or the auxiliary subscriber slide-in units, said subscriber slide-in unit connectors being connected to at least three cable connectors in such manner that when a first one of said cable connectors only is used, each subscriber slide-in unit connector is connected to receive a respective subscriber slide-in unit, when a second one of said cable connectors only is used, one of the subscriber slide-in unit connectors is connected to receive an auxiliary subscriber slide-in unit and the remaining subscriber slide-in unit connectors are connected to receive a respective subscriber slide-in unit; and when a third one of said cable connectors only is used, two of the subscriber slide-in unit connectors are connected to receive in series a respective auxiliary subscriber slide-in unit connectors are connected to receive a respective subscriber slide-in unit.

4,930,047

APPARATUS FOR INTERCONNECTING COMPONENTS OF A POWER OUTLET STRIP

Gerald E. Peterson, Riverside, Calif., assignor to The Toro Company, Minneapolis, Minn.

Filed Sep. 12, 1988, Ser. No. 242,579
Int. Cl.[5] H01H *83/02*
U.S. Cl. 361—395 **6 Claims**



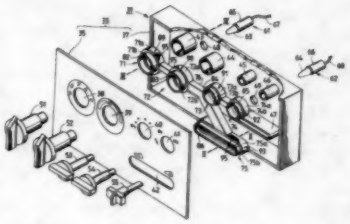
1. A power outlet device comprising:
(a) a strip assembly comprising:
(i) an elongate conductive ground strip;
(ii) an elongate conductive neutral strip; and
(iii) an elongate conductive hot strip;
(b) a printed circuit board assembly comprising a power conditioning circuit;;
(c) a case receiving the strip and printed circuit board assemblies, the case comprising top and bottom surfaces which are substantially parallel to one another; and
(d) conductive resilient contact means connected to and extending from the printed circuit board assembly and operatively connecting the printed circuit board assembly to the strip assembly, wherein the assemblies are conductively interconnected simply by positioning the printed circuit board assembly relative to the strip assembly such that the contact means springingly engages the strip assembly, wherein:
(i) the ground strip forms a ground contact area substantially parallel to the top and bottom case surfaces;
(ii) the neutral and hot strips form neutral and hot contact areas substantially perpendicular to the top and bottom case surfaces;
(iii) the conductive resilient contact means comprises a dogleg-shaped ground contact spring engaging the ground contact area;
(iv) the contact means further comprises neutral and hot resilient conductive blades springingly engaging the neutral and hot contact areas, respectively;
(v) the printed circuit board assembly comprises a substrate substantially parallel to the top and bottom case surfaces and the ground contact spring comprises a first portion adjacent the substrate, and a second portion angling therefrom, wherein the free end of the second portion contacts the ground contact area; and
(vi) the neutral and hot contact blades each comprise a flat portion fixed to the substrate and perpendicular thereto, and a curved portion having a convex side and a concave side, wherein the concave sides of the blades face in opposite directions, and the convex sides of the blades engage the neutral and hot contact areas.

4,930,048

AIR-CONDITIONING CONTROL BOX

Kuniyasu Ito, Gifu, Japan, assignor to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Filed Sep. 26, 1988, Ser. No. 248,718
Claims priority, application Japan, Sep. 26, 1987, 62-241760; Jun. 28, 1988, 63-159709
Int. Cl.[5] F21Y *33/00*
U.S. Cl. 362—26 **11 Claims**



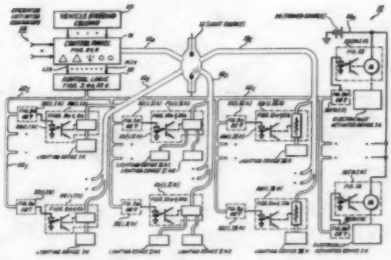
1. A casing assembly, comprising:
a casing comprising a front panel and a rear box, said front panel formed with a hole therein;
a light source mounted in said casing;
control means disposed in the hole formed in the front panel and coupled to the casing;
a light transmission member made of a material that transmits light, said light transmission member including a light-incident surface disposed inside the casing and a light-emitting surface disposed at the hole; and
a shading coating that partially coats a portion of the light-incident surface of said light transmission member which portion is located to receive a larger amount of light, to make uniform the brightness of the light emitting surface.

4,930,049

OPTICAL MULTIPLEXED ELECTRICAL DISTRIBUTION SYSTEM PARTICULARLY SUITED FOR VEHICLES

John M. Davenport, Lyndhurst, and Richard L. Hansler, Pepper Pike, both of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 27, 1988, Ser. No. 290,005
Int. Cl.[5] F21V *7/04*; G02F *1/00*
U.S. Cl. 362—32 **36 Claims**



1. An control system for a vehicle comprising;

(a) a light source that generates light energy for a plurality of light busses which are routed within said vehicle and provide the light energy for lighting devices;

(b) a power source for a power buss that is routed to and provides electrical energy for electrical activation of devices of said vehicle;

(c) at least one control panel connected to one of said light busses and responsive to a plurality of operator initiated commands for controlling said electrically activated devices and for controlling lighting devices of said vehicle, said control panel being further responsive to operator initiated commands signalling the forthcoming motion of the vehicle, said control panel generating a plurality of output signals each respectively representative of said operator initiated commands.

(d) control logic responsive to said output signals of said control panel for generating corresponding control signals onto a control buss routed within said vehicle;

(e) a device for respectively interfacing each of said electrically activated devices and said lighting devices with said control buss, each of said control buss interfacing devices responding to the respective output signals related to said electrically activated devices along with said lighting devices and generating an output signal in response thereto;

(f) a device for respectively interfacing each of said lighting devices with a related light buss, each of said lighting buss interfacing devices coupling its respective lighting device to its related light buss in response to a respective output signals from said respective control buss interfacing device; and

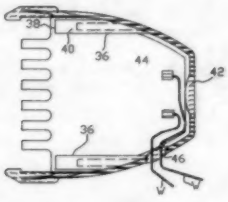
(g) a device for respectively interfacing each of said electrically activated devices with said power buss, each of said power buss interfacing devices coupling respective electrically activated devices to said power buss in response to a respective output signal from said respective control buss interfacing device.

4,930,050

HOUSING FOR AUTOMOBILE LAMPS

Julius Poizner, 100 Westgate Boulevard, Downsview, Ontario, Canada M3H 1P3

Filed Aug. 21, 1989, Ser. No. 396,267
Int. Cl.[5] B60Q *1/00*
U.S. Cl. 362—61 **14 Claims**



1. A housing for an automotive lamp or the like comprising:

a thin, deeply dished bowl of high impact, resilient thermopastic mateial, said bowl having a polar axis and a rim thereto;

said rim being defined by a plurality of longitudinally aligned fingers terminating in an equatorial plane, and

a cowl of elastomeric material covering said rim to form a seal for the lens of a lamp when contained within said housing,

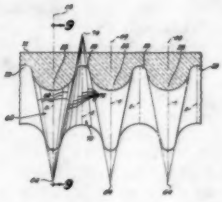
said elastomeric material and said thermoplastic material being compatible and welded together at the interface therebetween.

4,930,051

HEADLAMP WITH SLOPED LENS INCLUDING BEAM-SPREADING FLUTES

Thomas M. Golz, Willoughby Hills, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed Apr. 7, 1989, Ser. No. 334,629
Int. Cl.[5] B60Q *1/02*
U.S. Cl. 362—61 **28 Claims**



1. A headlamp for a motor vehicle comprising an envelope for enclosing a light source, the envelope comprising a lens and a reflector for reflecting light rays from said light source through said lens, said lens having:

(a) two regions that respectively are normally near the top and the bottom of said lens,

(b) a front surface that is normally sloped backwardly so that said bottom region is normally positioned forwardly of the top region, considered in the direction of normal forward motion of the vehicle,

(c) a back surface including in a localized zone of said lens side-by-side ridges, each having a summit as viewed in horizontal planes through the ridge, each summit extending lengthwise of the associated ridge along a ridge reference line, said ridge reference lines (i) extending generally parallel to said front surface and (ii) in a direction between said top and bottom regions, said ridges being individually characterized by having generally the form of a segment of an inverted, base-up cone, and

(d) a concave groove in said back surface located between said ridges and having a nadir as viewed in horizontal planes through the groove, said nadir extending lengthwise of the groove along a groove reference line, said groove being characterized by having generally the form of a segment of an upright, base-down cone and by having said groove reference line extending substantially parallel to said ridge reference line of a juxtaposed ridge.

4,930,052

ILLUMINABLE JEWELRY ITEM

Joel Beige, East Hills, N.Y., assignor to Rubie's Costume Co

Filed Jun. 13, 1989, Ser. No. 365,481
Int. Cl.[5] F21L *15/08*
U.S. Cl. 362—104 **1 Claim**

1. An illuminable jewelry item comprising:

a housing having an opening defining a thin guide slit;

illumination means positioned in said housing for supplying light;

power supply means positioned in said housing for selectively supplying power to said illumination means;

thin, fully non-conductive switch means extendible through said guide slit of said opening in said housing between said power supply means and said illumination means for selectively interrupting the supply of power from said power supply means to said illumination means; and

said switch means being fully detachable from said housing by pulling through said guide slit, and when so detached allowing said power supply means to contact and illuminate said illumination means.

4,930,053

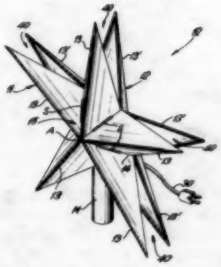
ELECTRICALLY LIGHTED ORNAMENT

Michael Vaught, 28 Windmill Rd., Armonk, N.Y. 10504

Filed Dec. 30, 1988, Ser. No. 292,427

Int. Cl.[5] F21P *1/02*

U.S. Cl. 362—121 **4 Claims**



1. A hollow ornament having a front wall and a back wall, the back wall and front wall being peripherally coextensive, joined at selected peripheral locations and providing peripheral apertures between the locations of joinder, at least the inner surfaces of at least one of said front and rear walls being light reflective, and means for mounting a light source within the ornament, an inner surface of said at least one of said front and rear walls being positioned relative to said mounting means so as to comprise means for reflecting light from a light source mounted in said mounting means through said peripheral apertures at non-radial angles.

4,930,054

DUAL CONE RECESSED LIGHTING FIXTURE

Werner W. Krebs, Crestview Hills, Ky., assignor to NuTone, Inc., Cincinnati, Ohio

Filed Dec. 9, 1988, Ser. No. 281,702

Int. Cl.[5] F21S *1/02*

U.S. Cl. 362—149 **28 Claims**

1. A thermally protected lighting fixture for recessed ceiling installation where the fixture will be surrounded by insulation, said fixture comprising:

a housing having an inside surface, an outside surface, and a downwardly facing open lower end, said outside surface being capable of contacting insulation when the fixture is installed in an insulated ceiling;

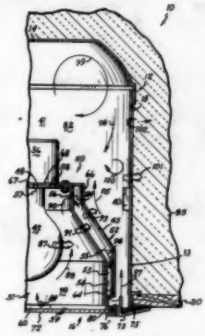
means for mounting the fixture to a ceiling so as to support said fixture with at least a portion of said housing above said ceiling and in contact with the insulation;

a downwardly facing reflector assembly supported from said housing and positioned in said housing across said open end to form a chamber between said reflector assembly and said inside surface of said housing;

said reflector assembly including an inner reflector, having a lower rim adjacent said housing opening, said inner reflector defining therein and surrounding an interior space above said rim;

said reflector assembly further including a downwardly concave outer reflector liner overlying at least a portion of said reflector and mounted spaced from said inner reflector so as to define an air gap between said liner and said inner reflector;

said liner having a first air passage therein spaced above said housing open end and above said inner reflector rim, said first air passage communicating said gap near the bottom thereof with said chamber;



said inner reflector having a second air passage therethrough connecting said space with said gap above said first passage;

a lamp socket mounted on said fixture so as to support a lamp within said space, and electrical conductors connected to said socket for connecting said lamp in a circuit with a power source; and

temperature responsive circuit interrupter means mounted inside of said housing in said chamber above said first passage, said interrupter including temperature sensor means electrically connected in said circuit and operative for interrupting said circuit in response to a predetermined temperature condition.

4,930,055

MARKER LAMP WITH HALO EFFECT

Robert A. Swadell, Henderson, Nev., assignor to Geisha Corporation, Henderson, Nev.

Filed Jun. 10, 1989, Ser. No. 360,171

Int. Cl.[5] F21V *5/00*

U.S. Cl. 362—244 **11 Claims**

1. An electric lamp comprising:

an elongated transparent tube having a transparent wall;

a plurality of incandescent, filament-type bulbs mounted within said tube and spaced substantially along the longitudinal axis thereof; and

straight, longitudinally extending striation means, in one of the inner and outer surfaces of said tube, for forming

inside said transparent wall, when said bulbs are illuminated, a plurality of corresponding halos centered on the

bulbs and lying in respective planes perpendicular to said longitudinal axis.

4,930,056

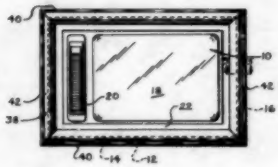
SNAP-ON FRAME FOR LIGHT FIXTURES

James G. Stephenson, Kalamazoo, and Mark D. Huggett, Battle Creek, both of Mich., assignors to Progressive Dynamics, Inc., Marshall, Mich.

Filed May 30, 1989, Ser. No. 358,169

Int. Cl.[5] F21V *17/00*

U.S. Cl. 362—364 **8 Claims**



1. A snap-on frame for light fixtures having a circumference defined by a periphery having opposite sides and including an outer face and an edge transversely disposed to the outer face comprising, in combination, a frame formed of synthetic plastic semi-rigid flexible, resilient material having an overall generally planar configuration complementary to that of the light fixture periphery, said frame including opposite sides each including an abutment surface, a skirt having an inner surface and a plurality of elongated spaced ribs, said ribs being affixed to said skirt inner surface and transversely disposed to the general plane of said frame and each including an inner surface, said ribs' inner surface including a protuberance, the distance between the protuberances on opposite sides of said frame being slightly less than the distance separating opposite sides of the fixture periphery whereby placing said frame upon the periphery of the fixture causes said protuberances to engage the fixture edge slightly deforming the frame whereby said frame is frictionally held on the fixture periphery.

4,930,057

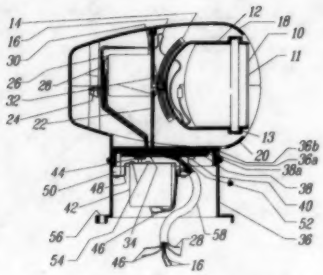
SEARCHLIGHT DRIVE MEANS AND APPARATUS

Jack L. Williams, Orange, Calif., assignor to ITT Corporation, New York, N.Y.

Filed May 15, 1989, Ser. No. 351,700

Int. Cl.[5] F21V *21/26*

U.S. Cl. 362—272 **15 Claims**



1. Searchlight apparatus comprising:

lamp means mounted in a lamp housing for vertical movement;

vertical drive means mounted in said lamp housing for vertically driving said lamp;

base means for mounting said lamp housing;

horizontal drive means for driving said lamp means and lamp housing in a horizontal plane less than 360 degrees; and

said lamp means including a bulb housing with a bearing means for mounting in said lamp housing, and said bulb housing including an integrally formed vertical gear member.

4,930,058

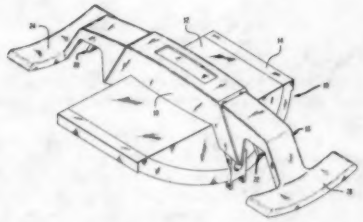
QUICK-RELEASE DENTAL LIGHT HANDLE

Arthur L. Jones, and George McGaha, both of Charlotte, N.C., assignors to The Pelton & Crane Company, Charlotte, N.C.

Filed Nov. 9, 1989, Ser. No. 434,387

Int. Cl.[5] F21L *15/12*

U.S. Cl. 362—400 **18 Claims**



1. A unitary, quick-release handle for use on a dental, medical or similar lighting fixture, said handle comprising a first handgrip located at one end thereof, a second handgrip located at an opposite end thereof and attaching means located between said ends of said handle for releasably attaching said handle to a lighting fixture.

4,930,059

SWITCHED-MODE DC-TO-DC POWER CONVERTER

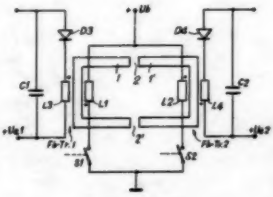
Winfried P. Rütt, Hauptstrasse 67, D-6087 Büttelborn 2, Fed. Rep. of Germany

Filed Oct. 26, 1987, Ser. No. 113,004

Claims priority, application Fed. Rep. of Germany, Oct. 31, 1986, 3637079

Int. Cl.[5] H02M *3/335*

U.S. Cl. 363—20 16 Claims



1. A switched-mode DC-to-DC power converter, which combines a flyback-type converter with a forward-type converter, containing at least one first flyback transformer and one second flyback transformer, each of said transformers respectively including at least one primary winding and one secondary winding, wherein a timed primary switch is wired in series with each of the primary windings, respectively, and a secondary switch is wired in series with each of the secondary windings, respectively, characterized in that the transformers are loosely linked with each other by a link circuit, which transmits energy respectively from the transformer which is just in the forward phase to the other transformer.

4,930,060

SWITCH-MODE POWER SUPPLY

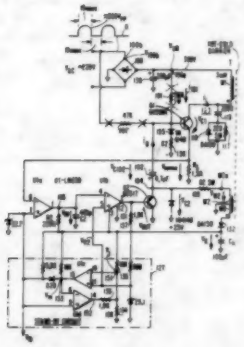
Giovanni M. Leonardi, Zurich, Switzerland, assignor to RCA Licensing Corporation, Princeton, N.J.

Filed Nov. 14, 1988, Ser. No. 270,877

Claims priority, application United Kingdom, Oct. 3, 1988, 8805759

Int. Cl.[5] H02M *3/335*

U.S. Cl. 363—21 26 Claims



1. A switch mode power supply, comprising:

a source of an input supply voltage;

a transformer having first and second windings;

a controllable switch having a main current conducting terminal coupled to said first winding and to said source of said input supply voltage, said controllable switch being switched by a periodic first control signal for generating a first switching current in said first winding that stores magnetic energy in said transformer;

means coupled to said transformer and responsive to said first switching current for producing from said stored energy an output supply voltage that is coupled to a load;

a current sampling, first impedance coupled in a current path that includes said first winding for conducting at least a portion of said first switching current in said first impedance to develop in said first impedance a current sampling signal that is indicative of a level of said first switching current when said controllable switch is conductive;

means responsive to said current sampling signal for generating said first control signal to switch said controllable switch into nonconduction when said first switching current exceeds a predetermined level;

means for applying a low impedance to said second winding after a first conduction interval of said controllable switch has elapsed, to cause said first switching current to exceed said predetermined level; and

means for varying said first conduction interval in accordance with said output supply voltage such that a duty cycle of said controllable switch varies in a negative feedback manner for regulating said output supply voltage.

4,930,061

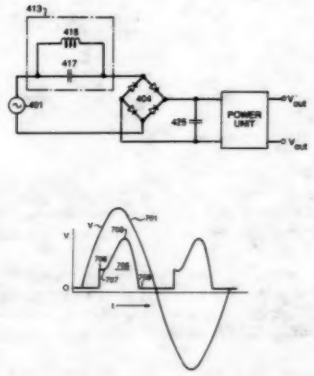
METHOD AND NETWORK FOR ENHANCING POWER FACTOR OF OFF-LINE SWITCHING CIRCUIT

William F. Slack, Lake Hiawatha, and James C. Wadlington, Mendham, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Apr. 7, 1989, Ser. No. 335,012

Int. Cl.[5] H02M *1/12*

U.S. Cl. 363—44 5 Claims



1. An input network for a switching circuit, comprising:

an input for accepting an AC voltage;

an output for coupling DC voltage to a power switching circuit;

a rectifier circuit intermediate the input and output, and including;

a rectifying network of rectifiers, and a voltage storage capacitor intermediate the rectifying network and output; and

a current waveform control circuit intermediate the input and the rectifying network, the current waveform control circuit having;

an inductor and a capacitor connector at least partially in parallel circuit with each other, and the parallel circuit connected in series with the input, the inductor and capac-

itor having component values selected such that its induced resonant ringing is at a frequency exceeding six times a frequency of the AC voltage and at a non-harmonic and non-integer multiple of the frequency of the AC voltage applied to the input such that a voltage induced across the capacitor adds to a voltage of a leading edge of the AC voltage to enhance biasing the rectifiers into conduction and a voltage induced across the inductor enhances conduction in the rectifiers during a trailing edge of the AC voltage;

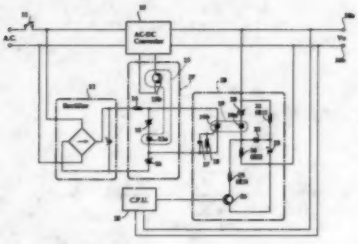
whereby the parallel circuit ringing is operative for inducing conduction of the rectifiers prior to a first time instant when the applied AC voltage magnitude would bias the rectifiers into conduction and extending conduction beyond a second time instant when the applied AC voltage magnitude would permit the rectifiers to terminate conduction.

4,930,062

COMPUTER POWER SUPPLY WITH OPTICALLY ISOLATED SHUTDOWN CIRCUITS

Masanori Yamada, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Sep. 14, 1989, Ser. No. 407,086
Claims priority, application Japan, Sep. 14, 1988, 63-232029
Int. Cl.[5] H02H *7/10*
U.S. Cl. 363—55 **3 Claims**



1. A direct-current power supply comprising:

AC-DC converter means for converting alternating-current power from an external AC power source to direct-current power;

rectifier means for converting alternating-current power from the external source to direct-current voltage;

a first light-emitting diode connected to the rectifier means for emitting light in response to a direct-current voltage therefrom;

a phototransistor optically coupled with the first light-emitting diode and connected in the AC-DC converter means for activating same in response to the light from the first light-emitting diode;

a second light-emitting diode;

a photo-thyristor connected to said rectifier means and optically coupled with the second light-emitting diode for establishing a low-impedance path across the first light-emitting diode in response to light from the second light-emitting diode;

switching means connected to output terminals of the AC-DC converter means and responsive to a shutdown command signal applied thereto for activating the second light-emitting diode to cause light to be emitted therefrom to the photo-thyristor; and

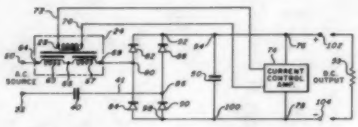
latching means connected between the rectifier means and a gate electrode of the photo-thyristor.

4,930,063

VARIABLE RESONANCE REGULATOR FOR POWER SUPPLY

Christopher P. Henze, Minnetonka, and Joseph H. Mulkern, St. Paul, both of Minn., assignors to Unisys Corporation, Blue Bell, Pa.

Filed Apr. 17, 1989, Ser. No. 339,558
Int. Cl.[5] H02M *7/04*
U.S. Cl. 363—91 **22 Claims**



1. A frequency controlled resonant regulator comprising:

input means for receiving an alternating current signal operable at a predetermined frequency,

a control transformer having a primary winding and at least one pair of secondary windings, said secondary windings of said at least one pair being connected in series opposition, and said transformer being constructed and arranged to have a variable inductance that is substantially linearly proportional to a D.C. control current through said primary winding,

a load circuit for providing a regulated direct current power source, said secondary windings having a first end coupled to said input means and a second end coupled to said load circuit,

resonating capacitor means coupled to said input means and to said secondary windings for forming a tuned circuit with the inductance of said transformer, and

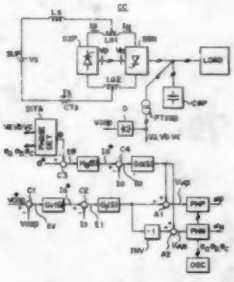
control means coupled to said load circuit for sensing the output of said regulator and for providing said control current to said transformer which thereby varies said inductance in order to regulate the output of said regulator in response to said output.

4,930,064

PHASE STABILIZED HIGH FREQUENCY LINK POWER CONVERTER APPARATUS HAVING A WIDE PHASE CONTROLLABLE RANGE

Shigeru Tanaka, and Kazutoshi Miura, both of Tokyo, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 12, 1988, Ser. No. 256,574
Claims priority, application Japan, Oct. 12, 1987, 62-254571
Int. Cl.[5] G05F *1/70*
U.S. Cl. 363—161 **6 Claims**



1. A power converter apparatus comprising:

power source means for supplying electric power;

a capacitor, serving as a high frequency power source, to which a high frequency voltage is applied;

a circulating current type AC-AC converter having a terminal coupled to said capacitor and another terminal coupled to said power source means;

reference signal means for generating a phase reference signal; and

operation control means, coupled to said AC-AC converter and said reference signal means, and being responsive to a prescribed phase reference value and a phase difference between said high frequency voltage and said phase reference signal, for converging the phase difference to the prescribed phase reference value, and controlling operation of said AC-AC converter in accordance with the prescribed phase reference value;

wherein said operation control means includes:

voltage detector means, coupled to said capacitor, for detecting said high frequency voltage;

phase comparator means, coupled to said voltage detector mans and said reference signal means, for comparing a phase of said high frequency voltage with that of said phase reference signal, and generating a phase difference signal representing the phase difference between said high frequency voltage and said phase reference signal;

error detector means, coupled eo said phase comparator means and being responsive to said prescribed phase reference value, for detecting a phase error signal representing a difference between said prescribed phase reference value and said phase difference signal; and

means coupled to said error detector means, said AC-AC converter, and said reference signal means, for controlling a circulating current flowing throùgh said AC-AC converter in accordance with said phase error signal, so that the phase difference between said high frequency voltage and said phase reference signal is converged to said prescribe phase reference value.

4,930,065

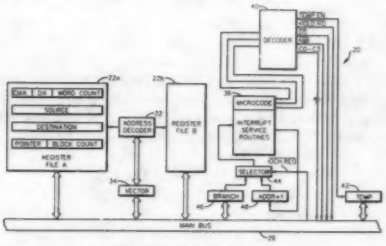
AUTOMATIC DATA CHANNELS FOR A COMPUTER SYSTEM

Angus McLagan, Newport Beach; Gei-Jon Pao, Garden Grove; Chong S. Un, Anaheim, all of Calif., and John J. Pearce, Jr., Del Valle, Tex., assignors to David Computer Corporation, Irvine, Calif.

Continuation of Ser. No. 088,617, Aug. 20, 1987, abandoned. This application Aug. 21, 1989, Ser. No. 397,645

Int. Cl.[5] **G06F** *9/00, 9/22*

U.S. Cl. 364—200 **21 Claims**



1. A processor-controlled, interruptdriven data communications system for a computer having a central processing unit and a memory for transferring data between the memory and a plurality of peripheral devices without requiring an interrupt context switch for each data transfer, said system comprising:

a bus connecting said memory and said peripheral devices;

a resident microcode within said central processing unit that controls the gate and register level operation of said central processing unit, said resident microcode including an input/output service routine;

a plurality of register locations resident in said central processing unit dedicated to data communications; and

an address generator that generates an address vector when data is transferred between said memory and a first one of said peripheral devices in response to a request from said first peripheral device, said address vector generated in response to vector data on said bus uniquely associated with said first peripheral device, said address vector comprising an address of one of said register locations, said register location including a pointer to a location in memory that stores data transferred between said memory and said first peripheral device and an address of said input-/output service routine in said resident microcode, said resident microcode operating in response to said address from said register location to execute said input/output service routine and transfer data between said memory and said first peripheral device, said data transferred as blocks of data, said register location storing a data control block that includes a count that indicates a number of blocks of data to be transferred, a count of the amount of data remaining to be transferred in a block of data and a pointer to a data control block for a next block of data to be transferred, said resident microcode accessing said data control block to control the transfer of said blocks of data without requiring a context switch by said central processing unit while said blocks of data are being transferred, said address generator further responsive to requests from a second one of said peripheral devices to address a second register location that includes data to cause said resident microcode to interleave transfers of data between said memory and said second peripheral device with transfers of data between said memory and said first peripheral device, said resident microcode interleaving said transfers of data without requiring execution of instructions by said central processing unit when said interleaving occurs.

4,930,066

MULTIPORT MEMORY SYSTEM

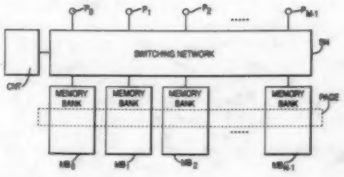
Haruo Yokota, Kawasaki, Japan, assignor to Agency of Industrial Science and Technology, Tokyo, Japan

Continuation of Ser. No. 10,274, Dec. 23, 1986, abandoned. This application Apr. 26, 1989, Ser. No. 344,507

Claims priority, application Japan, Oct. 15, 1985, 60-229537

Int. Cl.[5] **G06F** *13/00, 13/06*

U.S. Cl. 364—200 **4 Claims**



1. A multiport memory system, comprising:

a plurality of data input/output ports for providing page addresses only once per page;

a plurality of memory banks for storing pages of data, each page stored across all of said memory banks and addressed page by page using the page addresses from said data input/output ports, each of said memory banks including means for calculating addresses to access all of the data within each page; and

a switching network, connected to said data input/output ports and said memory banks, for rotating logical connections from each of said data input/output ports to all of said memory banks by sequential switching of data lines in

said switching network, for transferring the page addresses from said data input/output ports to any of said memory banks connected thereto when a page access is initiated and for transferring data from said memory banks to said data input/output ports connected thereto for each of the logical connections, each of said memory banks passing an address directly to another memory bank adjacent thereto in synchronization with the rotating of the logical connections.

4,930,067

MICROCOMPUTER HAVING A HIGH-SPEED OPERATION MODE AND A LOW-SPEED OPERATION MODE WITH INTERMITTENT DISABLING OF SENSE AMPLIFIERS

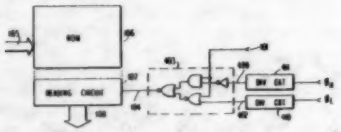
Michiya Nakamura, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Division of Ser. No. 4,927, Jan. 20, 1987. This application Jan. 18, 1989, Ser. No. 298,436

Claims priority, application Japan, Jan. 20, 1986, 61-10419

Int. Cl.[5] **G06F** *3/00, 9/00, 13/38, 15/16*

U.S. Cl. 364—200 **2 Claims**



1. A microcomputer comprising a memory having a plurality of bit lines and a dummy line, a first current mirror type sense amplifier having a current input terminal connected to one of said plurality of bit lines through a first switching circuit, a second current mirror type sense amplifier having a current input terminal connected to said dummy line through a second switching circuit, a signal derived from an output terminal of said second current mirror type sense amplifier being applied as a reference signal to said first current mirror type sense amplifier, an output of said memory being derived from an output terminal of said first current mirror type sense amplifier, a first means for selectively generating a first enable signal which is always activated in a high-speed operation mode and a second enable signal which is intermittently activated in a low-speed operation mode, and a second means coupled between said first means and said first and second switching circuits for controlling said first and second switching circuits according to said first and second enable signals in such manner that said first and second switching circuits are continuously turned on in response to the activated state of said first enable signal thereby to continuously enable said first and second current mirror type sense amplifiers, and are intermittently turned on in response to the activate state of said second enable signal thereby to intermittently enable said first and second current mirror type sense amplifiers.

4,930,068

DATA PROCESSOR HAVING DIFFERENT INTERRUPT PROCESSING MODES

Tsuyoshi Katayose, and Yukio Maehashi, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Nov. 9, 1987, Ser. No. 118,671

Claims priority, application Japan, Nov. 7, 1986, 61-265856; Nov. 7, 1986, 61-265858

Int. Cl.[5] **G06F** *13/00*

U.S. Cl. 364—200 **12 Claims**

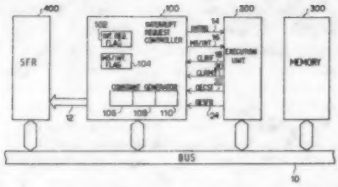
1. A data processor comprising:

an interrupt processing request controller receiving a processing request from at least one processing request generating source for generating an interrupt request,

an execution unit including at least a program counter and a program status word and having a first mode of executing the interrupt processing in accordance with an user's program and a second mode of executing the interrupt processing in accordance with a microprogram while maintaining an internal condition of the execution unit including conditions of at least the program counter and the program status word and used for execution of a program, and

a mode designation flag provided for one processing request generating source so as to designate whether the first mode or the second mode should be executed, the mode designation flag being selectively set or reset in accordance with a content of a processing request from the same processing request generating source,

whereby, when the mode designation flag indicates the first mode, the controller operates to respond to the processing request from the processing request generating source so



as to control the execution unit so that an execution of a program being executed is discontinued and contents of the program counter and the program status word when the execution of the program is executed are saved and thereafter a head address of an interrupt processing routine stored in the user's program is set to the program counter so that the interrupt processing routine is executed using the program counter and the program status word, and

whereby, when the mode designation flag indicates the second mode, the controller operates to respond to the processing request from the processing request generating source so as to control the execution unit so that an execution of a program being executed is discontinued and an interrupt processing based on the processing request is executed by using the microprogram without saving contents of the program counter and the program status word and without using the user's program.

4,930,069

MECHANISM AND METHOD FOR TRANSFERRING DATA BETWEEN BUS UNITS HAVING VARYING MASTER AND SLAVE DMA CAPABILITIES

Surinder P. Batra; William E. Hammer, both of Rochester; Gene A. Lushinsky, Mantorville; David W. Marquart, Rochester; Walter H. Schwane, Kasson, and Frederick J. Ziecina, Rochester, all of Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 18, 1987, Ser. No. 122,294

Int. Cl.[5] **G06F** *15/16, 13/00*

U.S. Cl. 364—200 **19 Claims**

1. A first bus unit having master DMA capability, coupled to a bus connecting other bus units which have processors and storage, at least one of which has slave DMA capability, the first bus unit comprising:

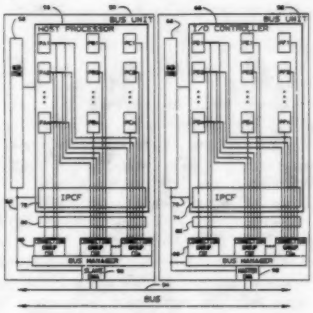
at least one processor which executes a plurality of processes, said processes requesting work from other processes on other bus units and serving work requests from other processes on other bus units, said work serving processes controlling the flow of data transfers associated with the work processing;

a bus manager for connecting said processes to the bus, and

for insulating said processes from communication management, the bus manager comprising:

means for receiving an original work request from a process on its associated bus unit, said work request identifying data associated with it and identifying a server bus unit which should serve the work request;

means for generating a message representative of the original work request;



means for sending the bus message to the bus unit identified in the original work request; and

means for receiving a second work request from the server bus unit in response to the message; and

means for sending data to the main storage of the server bus unit associated with the original work request to the main storage locations identified in the second work request received from the server bus unit.

4,930,070

INTERRUPT CONTROL METHOD FOR MULTIPROCESSOR SYSTEM

Mikio Yonekura, Hachioji, and Jiro Kinoshita, Yamato, both of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

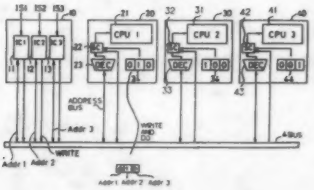
PCT No. PCT/JP87/00225, § 371 Date Nov. 25, 1987, § 102(e) Date Nov. 25, 1987, PCT Pub. No. WO87/06370, PCT Pub. Date Oct. 22, 1987

PCT Filed Apr. 10, 1987, Ser. No. 138,459

Claims priority, application Japan, Apr. 15, 1986, 61-086921

Int. Cl.[5] G06F *13/24*

U.S. Cl. 364—200 **5 Claims**



1. An interrupt control method for a multiprocessor system in which a plurality of processors including a plurality of control circuits and an interface circuit for causing interrupts are connected to a bus, the number of control circuits corresponding to the number of processors, the method comprising the steps of:

(a) employing a particular address having any number of bits as an interrupt address;

(b) applying an interrupt signal to an interrupt control circuit, the interrupt control circuit sending bit data of the particular address onto an address bus;

(c) selecting a mask bit, from a mask bit register, corresponding to the particular address in each processor;

(d) storing the mask bit in a register in each processor;

(e) reading the bit data on the address bus, decoding the data, and comparing the bit data with the mask bit data in the mask bit register;

(f) allowing signals from a bus cycle generator circuit in the interface circuit to occupy the bus in response to an interrupt signal;

(g) sending a bit, indicative of a cause of the interrupt and corresponding to the address, onto the address bus; and

(h) enabling the respective processor to recognize an interrupt from the bit on the address bus corresponding to the address and the mask bit stored in the register.

4,930,071

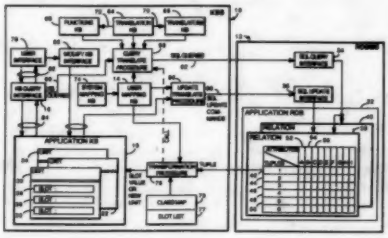
METHOD FOR INTEGRATING A KNOWLEDGE-BASED SYSTEM WITH AN ARBITRARY DATABASE SYSTEM

Frederich N. Tou, Sunnyvale, Calif., and Wagar Hasan, Allahabad, India, assignors to IntelliCorp, Inc., Mountain View, Calif.

Filed Jun. 19, 1987, Ser. No. 64,971

Int. Cl.[5] G06F *15/20*

U.S. Cl. 364—300 **32 Claims**



1. A method for manipulating an arbitrary relational database in a relational database management system on a computer system having a database query interface, said relational database including relations of tuples with attributes, in order to retrieve information for use in an application knowledge base on said computer system of a knowledge-based system, said method comprising the steps of:

(1) querying said relational database management system by means of a mapping system on said computer system on behalf of an application program associated with said application knowledge base as specified by a slot list and a class map of said mapping system for said arbitrary database, said class map having a slot whose values are slot maps, to return selected tuples;

(2) transforming by means of said mapping system said selected tuples into slot values; and

(3) supplying by means of said mapping system said slot values to slots of units of said application knowledge base.

4,930,072

METHOD FOR COMPUTING TRANSITIVE CLOSURE

Rakesh Agrawal, Chatham, and Hosagrahar V. Jagadish, Berkeley Heights, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Aug. 31, 1987, Ser. No. 91,236

Int. Cl.[5] G06F *15/40, 15/31*

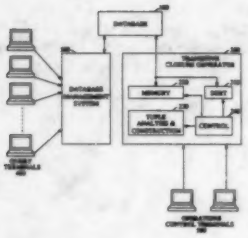
U.S. Cl. 364—300 **22 Claims**

1. In a system comprising a secondary memory and a controller with a primary memory, a method carried out in said controller for developing and storing in said second memory at least a portion of the transitive closure of a database stored in said secondary memory, where said database contains a plurality of entries and each entry contains a plurality of fields, whith each of said fields being assigned to a preselected attribute of

said database, and the signal value in each of said fields specifies the value associated with the corresponding attribute for that entry, and where said transitive closure is developed with respect to a selected field or fields of said database designated as a source node and a selected field or fields of said database designated as a destination node comprising:

a step of developing an ordering of said nodes in said database;

a step of developing a partition of said database and retrieving said partition from said secondary memory and placing it in said primary memory, where said partition contains all entries of said database that share a chosen set of source nodes;



a step of an entry by selecting one entry in said partition and one entry in either said partition or said database, where one entry is a head entry and one entry is a tail entry, and developing an entry for said transitive closure of said database with a source node being the source node of said head entry and a destination node being the destination node of said tail entry, when the destination node of said head entry is the same as the source node of said tail entry; and

a step of returning to said step of developing and retrieving a partition until the entire database has been partitioned.

4,930,073

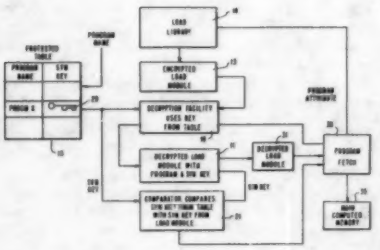
METHOD TO PREVENT USE OF INCORRECT PROGRAM VERSION IN A COMPUTER SYSTEM

Vincent J. Cina, Jr., Spring Valley, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 26, 1987, Ser. No. 66,909

Int. Cl.[5] G06F *13/00, 11/00, 12/14;* **H04L** *9/00*

U.S. Cl. 364—300 **4 Claims**



1. A method of preventing an incorrect program from executing in a computer system, said method using a single processor of said system and said method assuming the one seeking to execute said program is authorized to execute said program, said method comprising the steps of:

(a) encrypting with a linking means a load module, containing a correct program version to be protected and a respective synchronization key, with the synchronization key when one wishes to store the correct program version for future execution;

(b) storing with a linking means the respective synchronization key and the name of the load module in a table of a secure memory when one wishes to store the correct program version as in step (a);

(c) obtaining with a decryption facility a synchronization key corresponding to the name of a requested program to be executed from ' table in the secure memory if one wishes to execute the requested program, which requested program was stored in the same manner as provided for in steps (a) and (b);

(d) decrypting with a decryption facility the load module putatively containing the requested program with the synchronization key obtained in step (c) if one wishes to execute the requested program, the load module in this step being encrypted as in step (a) before being decrypted as in this step;

(e) extracting with a decryption facility the synchronization key in the decrypted load module of step (d) if one wishes to execute the requested program;

(f) comparing with a decryption facility the synchronization key obtained in step (c) with the synchronization key extracted in step (e) if one wishes to execute the requested program; and

(g) allowing with a decryption facility the requested program, which was decrypted in step (d), to be loaded into main memory and executed if the synchronization keys compared in step (f) are found to have some predetermined relationship.

4,930,074

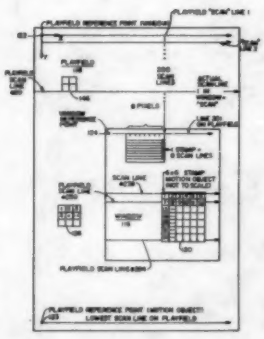
MULTIPLE STAMP MOTION OBJECTS IN A VIDEO GAME SYSTEM

Patrick J. McCarthy, San Jose, Calif., assignor to Atari Games Corporation, Milpitas, Calif.

Filed Oct. 15, 1986, Ser. No. 919,129

Int. Cl.[5] G09G *1/10*

U.S. Cl. 364—410 **9 Claims**



9. A method of calculating the address of pixel graphic data stored in a memory which describes the appearance of an object on a raster scanned video display, said object positioned on a playfield in playfield relative terms, said position being expressed as horizontal and vertical offsets from a reference point on said playfield, where said object is defined in said memory by an array of stamps having at least one row and at least one column of stamps of pixel graphic data where each stamp has a number and is comprised of a plurality of object scan lines each having a plurality of pixels of graphic data wherein said raster scanned video display includes sequentially scanned raster scan lines scanned from the top of said video

display to the bottom of each of said raster scan lines having a vertical position expressed in playfield relative terms as an offset from a reference raster scan line on said playfield, and a current raster scan line defined as the raster scan line being scanned at any particular moment comprising the steps of:

(1) determining from the vertical playfield relative positions of the object and the current raster scan line, the row in said array of stamps through which the current raster scan line would pass if the object had a predetermined size and the particular object scan line in said row which would coincide with the current raster scan line;

(2) calculating from the row determined in step 1 and from the vertical size of the object the offset of the current raster scan line from the top object scan line in the object;

(3) looking up a stamp offset defined as the number of stamps from the first stamp in the first row of the array to the stamp through which the current raster scan line first passes using the offset from the top object scan line to the current scan line determined in step 2 and the horizontal size of the object as pointers to the proper address in which the offset data is stored;

(4) determining a current stamp number from the stamp number calculated in step 3 using a signal from which can be derived the number of pixels of graphic data from said array which have been scanned; and

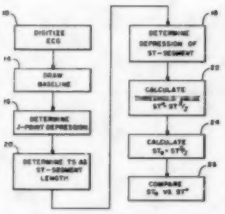
(5) generating the address in said memory of the pixel data for the current raster scan line and a current stamp defined as the stamp in said array having said current stamp number using the result of step 4 and a pointer address of the start of pixel data in said memory for said object.

4,930,075

TECHNIQUE TO EVALUATE MYOCARDIAL ISCHEMIA FROM ECG PARAMETERS

Ricardo G. Kortas, Stanford, Calif., assignor to The Board of Trustees of The Leland Stanford Junior University, Stanford, Calif.

Continuation of Ser. No. 73,335, Jul. 13, 1987, abandoned, which is a continuation of Ser. No. 646,224, Aug. 30, 1984, abandoned.
This application Jun. 6, 1988, Ser. No. 221,798
Int. Cl.[5] A61B *5/04*
U.S. Cl. 364—413.06 **12 Claims**



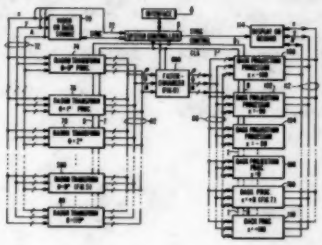
2. A signal processing system for evaluating and assigning a patient to normal or ischemic categories comprising means for generating a digital representation of an electrocardiogram of said patient, means for analyzing said electrocardiogram and calculating a critical threshold value for said electrocardiogram as a function of the length of the ST-segment of said electrocardiogram, means for calculating a value representing ST-segment depression relative to a fixed baseline based on said digitized signal information representing said baseline and said ST-segment to transform signals representing the ST-segment morphology into signals representing an equivalent horizontal morphology, comparison means for comparing said signals representing said horizontal morphology to signals representing said threshold value and assigning said patient to a normal or ischemic classification based on the result of said comparison.

4,930,076

SYSTOLIC RADON TRANSFORM PROCESSOR

John R. Meckley, Voorhees Township, Camden County, N.J., assignor to General Electric Company, Moorestown, N.J.

Filed Nov. 9, 1988, Ser. No. 269,027
Int. Cl.[5] G06F *15/62*
U.S. Cl. 364—413.21 **9 Claims**



1. A line-scan-to-Radon-transform converter adapted for receiving words representing the x- and y-axis Cartesian coordinate location of each pixel and words representing the amplitude of said pixel, comprising:

first memory means preprogrammed with information relating to a particular value of θ, the angle relative to said x-axis at which the Radon transform is to be calculated;

first multiplying means coupled to said first memory means and to sequentially receive, for each pixel in its turn, said x-axis word representing the x-position of said pixel for producing a first product signal representative of said x-axis word multiplied by a trigonometric function of θ;

second multiplying means coupled to said first memory means and to receive said y-axis word representing the y-position of said pixel for producing a second product signal representative of said y-axis word multiplied by another trigonometric function of θ;

adder means coupled to said first and second multiplying means for combining said first and second product signals relating to the same pixel for generating a sum signal indicative of the value of ρ at which said pixel contributes to the Radon transform for said value of θ;

second memory means including individual storage locations addressed by each of a plurality of values of ρ, said second memory means being addressed by said sum signal for producing for each addressed storage location a cumulated signal representing the current value of a line integral at the value of ρ corresponding to said pixel for said value of θ;

summing means coupled to said second memory means for receiving said cumulated signal from said storage location addressed by said sum signal for updating said cumulated signal at said storage location addressed by said sum signal by adding to said cumulated signal said word representing the amplitude of said pixel; and

means coupled to said second memory means and adapted for being enabled for reading from said storage locations the value of said line integral for each value of ρ at said value of θ.

4,930,077

INFORMATION PROCESSING EXPERT SYSTEM FOR TEXT ANALYSIS AND PREDICTING PUBLIC OPINION BASED INFORMATION AVAILABLE TO THE PUBLIC

David P. Fan, 2115 Dudley, St. Paul, Minn. 55108

Filed Apr. 6, 1987, Ser. No. 35,080
Int. Cl.[5] H04M *11/00*
U.S. Cl. 364—419 **110 Claims**

1. A system for processing information to determine ex-

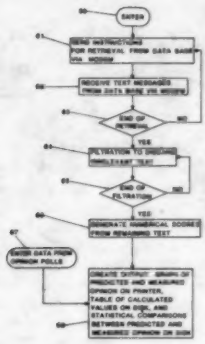
pected opinion in a specified population for a specified issue with two or more specified positions, said system comprising:

a digital computer;

software means operable in said computer for causing said computer to:

(a) maintain, for said issue, text comprised of a representative set of text messages used by members of said specified population over time for formulating opinions on said specified issue wherein said text messages are single packets of text information each able to support one or more of a plurality of said positions and transmitted in identical copies to the members of said specified population;

(b) search and operate on said text to determine the relationships in said text between one or more specified words within each text message;



(c) determine numerical scores for each said text message reflecting the extent said message favors each of said two or more specified positions on said issue, one of said numerical scores determined independently for the extent to which said message supports each of said specified positions based on said relationships of one or more specified words so that the value of each said numerical score is independent of the value of other scores determined for said message; and

(d) determine expected time trends of percentages of the population that favor said two or more positions on said issued based on determining changes in said percentages wherein said numerical scores are used to determine how said text messages will affect the opinions of members of said specified population to cause members to change from favoring one position to another.

4,930,078

SEMI-AUTOMATIC MECHANICAL TRANSMISSION CONTROL AND CONTROL METHOD

Michael W. Dunkley, Longridge, and John E. Stainton, Chorley, both of England, assignors to Eaton Corporation, Cleveland, Ohio

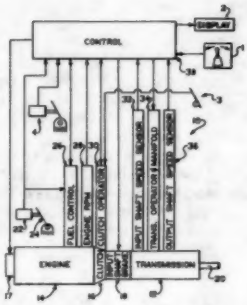
Continuation-in-part of Ser. No. 899,564, Aug. 22, 1986, which is a division of Ser. No. 755,628, Jul. 16, 1985, Pat. No. 4,648,290. This application Nov. 16, 1987, Ser. No. 121,381

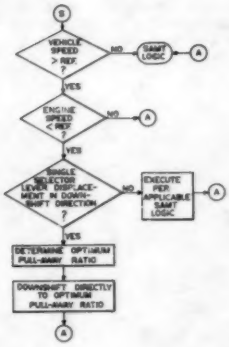
Claims priority, application European Pat. Off., Dec. 5, 1986, 86309479.3

Int. Cl.[5] **B60K** *41/08, 41/28*

U.S. Cl. 364—424.1 **18 Claims**

13. A control for a semi-automatic mechanical change gear transmission system (10) comprising a manual fuel throttle control (24), a fuel throttle controlled engine (14), a multi-speed change gear mechanical transmission (12), a friction master clutch (16) interposed the engine and transmission, a manually operated shift selection lever (1) moveable in a first direction from a centered position to select upshifts and in a second direction from said centered position to select downshifts from the currently engaged gear ratio, a central processing unit (38) for receiving inputs indicative of transmission input shaft and output shaft rotational speeds, of vehicle speed, of engine speed and of operation of said shift selection lever and for processing same according to predetermined logic rules to determined currently engaged gear ratio and to issue command output signals to non-manually controlled operators including a clutch operator (30), a fuel throttle control operator (26), and a transmission operator (34), logic rules causing said processing unit in a first mode of operation, to determine the transmission gear ratio selected by the operator to be





shifted into from the currently engaged ratio by assuming each displacement from the centered position of said shift selection lever in a given direction indicates operator selection of a change in ratio in said direction and in a second mode of operation causing said processing unit to interpret a single displacement of said shift selection lever from the centered position in the second direction as an operator selection of a downshift directly into an optimum pull-away ratio if vehicle speed is greater than a predetermined vehicle speed reference value and engine speed is less than a predetermined engine speed reference value.

4,930,079

THROTTLE-VALVE OPENING DEGREE CONTROL FOR AUTOMATIC STEP-WISE TRANSMISSION SYSTEM

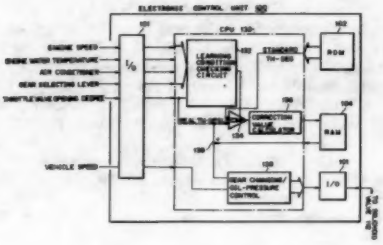
Shigeki Kondo, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 27, 1988, Ser. No. 212,372

Claims priority, application Japan, Jul. 2, 1987, 62-167175

Int. Cl.[5] G06F *15/20;* **H04L** *25/06*

U.S. Cl. 364—424.1 **5 Claims**



1. A method for regulating an automatic step-wise transmission system of a vehicle including a vehicle engine, comprising the steps of:

sensing real throttle-valve opening degree sensor data of the vehicle engine;

determining whether the vehicle engine is under start-up conditions when said real throttle-valve opening degree sensor data is sensed;

calculating a difference between said real throttle-valve opening degree sensor data sensed under the start-up conditions and reference throttle-valve opening degree data previously stored so as to obtain a correction value for said real throttle-valve opening degree sensor data;

correcting said real throttle-valve opening degree data by adding said correction value to produce controlling throttle-valve opening degree data; and

controlling the automatic step-wise transmission system by inputting said controlling throttle-valve opening degree data to as to produce a gear-changing control signal and to perform a gear-changing operation of the vehicle engine;

wherein said determining step further includes the steps of:

determining whether an engine speed of the vehicle engine is within a predetermined engine speed range;

determining whether a plurality of said sensed real throttle-valve opening degree sensor data contained fluctuation; and

determining whether the engine is in an idling operation state by comparing said real throttle valve opening degree sensor data and said reference throttle valve opening degree data.

4,930,080

CONTROL ARRANGEMENT FOR AUTOMATIC TRANSMISSION

Yutaka Suzuki, Hatano, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed May 12, 1988, Ser. No. 192,973

Claims priority, application Japan, May 15, 1987, 62-72644

Int. Cl.[5] B60K *41/06*

U.S. Cl. 364—424.1 **8 Claims**

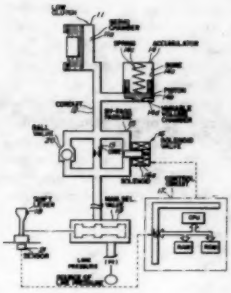
1. In a hydraulic control system including a source of hydraulic fluid

a friction element, said friction element having a fluid chamber, said fluid chamber being connected by conduit means with said source of hydraulic fluid;

an accumulator, said accumulator being fluidly communicated with said fluid chamber of said friction element;

a first valve disposed in said conduit means between said source and said fluid chamber of said friction element said first valve controlling fluid communication between said fluid chamber and said source of hydraulic fluid;

a manually operable device, said device being operatively connected with said first valve for selectively conditioning said first valve to supply said hydraulic fluid from said source to said friction element;



a one-way orifice disposed in said conduit means between said first valve and said fluid chamber of said friction element;

by-pass means for by-passing said one-way orifice, said by-pass means being responsive to said selectively operable device for bypassing said one-way orifice for a predetermined period following said value being conditioned by said manually operable device to supply said hydraulic fluid to said friction element.

4,930,081

SEMI-AUTOMATIC MECHANICAL TRANSMISSION CONTROL AND CONTROL METHOD

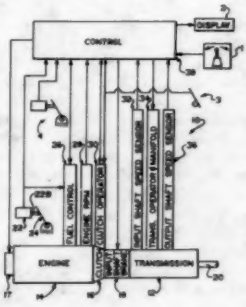
Michael W. Dunkley, Longridge Preston, and John E. Stainton, Chorley, both of England, assignors to Eaton Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 899,564, Aug. 22, 1986, Pat. No. 4,800,360, which is a division of Ser. No. 755,628, Jul. 16, 1985, Pat. No. 4,648,290. This application Nov. 16, 1987, Ser. No. 121,382

Claims priority, application European Pat. Off., Dec. 15, 1986, 86309747.3

Int. Cl.[5] B60K *41/18, 41/20;* **G05D** *17/02*

U.S. Cl. 364—424.1 **20 Claims**



1. A method of controlling a semi-automatic mechanical change gear transmission system (**10**) comprising a manual fuel throttle control (**24**), a fuel throttle controlled engine (**14**), a multi-speed change gear mechanical transmission (**12**), a fric-

tion master clutch (16) interposed the engine and transmission, a manually operated master clutch control (3), a manually operated shift selection lever (1) moveable in a first direction from a centered position to select upshifts and in a second direction from said centered position to select downshifts from the currently engaged gear ratio, a central processing unit (38) for receiving inputs indicative of transmission input shaft and output shaft rotational speeds, of vehicle speed, of engine speed and of operation of said shift selection lever and for processing same according to predetermined logic rules to issue command output signals to non-manually controlled operators including a clutch operator (30), a fuel throttle control operator (26), and a transmission operator (34), said processing unit sensing operation of said manual shift selection lever including the direction of movement thereof and the number of displacements of said lever within a predetermined period of time from said centered position, and, in a first mode of operation, determining the transmission gear ratio selected by the operator to be shifted directly into from the currently engaged ratio by assuming each repetition of displacement from the centered position of said shift selection lever in a given direction indicates operator selection of a change of one additional consecutive ratio in said direction; said method comprising:

providing said central processing unit with a signal (THPS) indicative of the operators manual engagement of the throttle control;

providing said central processing unit with a signal indicative of manual disengagement of the friction master clutch; and,

automatically selecting operation in a second mode of operation wherein a single displacement of said shift selection lever from the centered position in the second direction is interpreted as an operator selection of a downshift directly into transmission neutral if vehicle ground speed is less than a predetermined minimum vehicle ground speed reference value, the master clutch is manually disengaged and the operators manual engagement of the throttle control is not sensed.

11. A control system for a semi-automatic mechanical change gear transmission system (10) comprising a manual fuel throttle control (24), a fuel throttle controlled engine (14), a multi-speed change gear mechanical transmission (12), a friction master clutch (16) interposed the engine and transmission, a manually operated master clutch actuator (3), a manually operated shift selection lever (1) moveable in a first direction from a centered position to select upshifts and in a second direction from said centered position to select downshifts from the currently engaged gear ratio, a central processing unit (38) for receiving inputs indicative of transmission input shaft and output shaft rotational speeds, of vehicle speed, of engine speed and of operation of said shift selection lever and for processing same according to predetermined logic rules to issue command output signals to non-manually controlled operators including a clutch operator (30), a fuel throttle control operator (26), and a transmission operator (34), said processing unit sensing operation of said manual shift selection lever including the direction of movement thereof from said centered position, and, in a first mode of operation, determining the transmission gear ratio selected by the operator to be shifted into from the currently engaged ratio by assuming each displacement from the centered position of said shift selection lever in a given direction indicates operator selection of a change in ratio in said direction; said control characterized by:

means (22A) for providing a signal (THPS) to said central processing unit indicative of the operators manual engagement of the throttle control;

means for providing a signal to said central processing unit indicative of manual disengagement of the friction master clutch; and

means for automatically selecting operation in a second mode of operation wherein a single displacement of said shift selection lever from the centered position in the second direction is interpreted as an operator selection of a downshift directly into transmission neutral if vehicle ground speed is less than a predetermined minimum vehicle ground speed reference value, the master clutch is manually disengaged and the operators manual engagement of the throttle control is not sensed.

4,930,082

CONTROL APPARATUS FOR A VEHICULAR SUSPENSION SYSTEM

Mitsuhiko Hararı; Shozo Takizawa; Tadao Tanaka, all of Okazaki, and Shunichi Wada, Himeji, all of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha and Mitsubishi Denki Kabushiki Kaisha, both of Tokyo, Japan

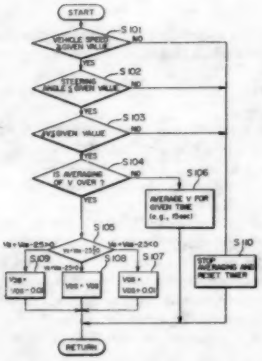
PCT No. PCT/JP88/00754, § 371 Date Mar. 6, 1989, § 102(e) Date Mar. 6, 1989, PCT Pub. No. WO89/00927, PCT Pub. Date Feb. 9, 1989

PCT Filed Jul. 27, 1988, Ser. No. 353,625

Claims priority, application Japan, Jul. 28, 1987, 62-189383

Int. Cl.[5] B60G *17/00*

U.S. Cl. 364—424.05 **6 Claims**



1. A control apparatus for a vehicular suspension system comprising:

a plurality of suspension units each disposed between a road wheel and the body of a vehicle for suspending the corresponding road wheel from the vehicle body;

an acceleration sensor sensing a transverse acceleration of the vehicle and providing an output acceleration signal which is representative of the sensed transverse acceleration and which has a neutral point representative of a transverse acceleration of 0 G;

a vehicle-speed sensor sensing the speed of the vehicle and providing an output signal representative of the sensed vehicle speed;

a steering sensor sensing the steering condition of the vehicle and providing an output signal representative of the sensed steering ondition;

control means connected to receive the output signals from said acceleration sensor, said vehicle-speed sensor and said steering sensor for calculating the rolling state of the vehicle due to the transverse acceleration thereof and controlling said respective suspension units based on the calculated rolling state of the vehicle so as to suppress the rolling thereof; and

drift compensation means connected to receive the output signals from said acceleration sensor, said vehicle-speed sensor and said steering sensor for compensating for a drift of the neutral point of the output signal of said acceleration sensor based on said output signals.

4,930,083

ANTI-SKID BRAKE CONTROL SYSTEM

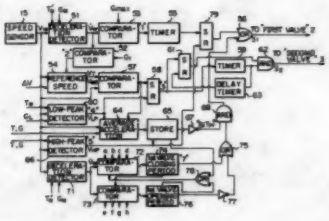
Akira Hoashi, Kawasaki; Hideo Akima, Yokohama; Haruki Shimanuki, Kasukabe, and Yuji Matsubara, Kazo, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 28,543, Mar. 20, 1987, abandoned. This application Oct. 20, 1988, Ser. No. 262,256

Claims priority, application Japan, Mar. 20, 1987, 61-062434

Int. Cl.[5] B61C *15/08*

U.S. Cl. 364—426.02 **6 Claims**



1. An anti-skid brake control system for a motor vehicle, comprising:

a wheel speed sensor which is disposed for each wheel of a vehicle and generates a pulse having a pulse cycle which corresponds to a revolutional speed of each wheel;

a pulse cycle measuring circuit for detecting the cycle of the pulses of the pulse signal from the wheel speed sensor; and,

condition setting means for setting anti-skid brake control condition factors in accordance with various wheel speeds by changing one of the factors of T_0, a predetermined time, and G_0, a predetermined value, responsive to wheel speed in accordance with the wheel speed classified as ranges of low speed, middle speed and high speed, where anti-skid brake control is started if a deceleration state, in which deceleration is greater than G_0, is continued for more than the predetermined T_0 and one of T_0 and G_0 is increased when wheel speed becomes high.

4,930,084

VEHICLE CONTROL SYSTEM

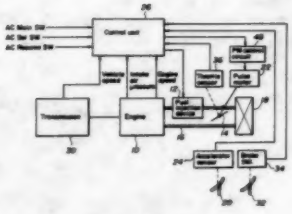
Takefumi Hosaka; Yasuhisa Arai, and Hiroki Matsui, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 19, 1988, Ser. No. 196,381

Claims priority, application Japan, May 19, 1987, 62-123061; May 19, 1987, 62-123062

Int. Cl.[5] G06F *15/50*

U.S. Cl. 364—426.04 **27 Claims**



9. A vehicle autocruise control system, comprising;

first means for detecting operating condition of the vehicle including vehicle speed, said operating condition having been assigned a fuzzy set with a membership function;

second means for carrying out fuzzy inference by applying the detected operating condition to the fuzzy set to determine a control value; and

actuator means for changing the vehicle speed in response to the control value.

4,930,085

METHOD FOR DETERMINING THE HEADING OF AN AIRCRAFT

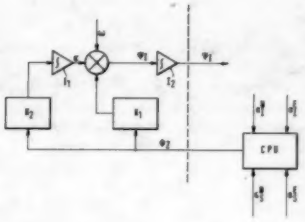
Michael Kleinschmidt, Schallstadt-Mengen, Fed. Rep. of Germany, assignor to Litef GmbH, Freiburg im Breisgau, Fed. Rep. of Germany

Filed Oct. 15, 1987, Ser. No. 109,238

Claims priority, application European Pat. Off., Oct. 16, 1986, 86114345.1

Int. Cl.[5] G06F *15/50*

U.S. Cl. 364—449 **5 Claims**



1. A method for determining the heading of an aircraft equipped with at least one inertial navigation system that includes two accelerometers, and a device for receiving data obtained from the signals of navigation satellites and for computing the aircraft's position, velocity, and acceleration therefrom, said method comprising the steps of:

(a) determining data corresponding to the initial attitude of an aircraft-fixed coordinate system relative to an earth-fixed coordinate system during a pre-flight alignment of the aircraft's inertial navigation system; then

(b) storing said initial attitude data; then

(c) measuring the acceleration data occurring during operation with respect to the aircraft-fixed coordinate system; then

(d) converting the acceleration data from the aircraft-fixed coordinate system into a coordinate system which has been horizontally aligned with the earth-fixed coordinate system using the initial attitude data; then

(e) determining the heading from the difference angle (ϕ_Z) between the acceleration vector ($a_I^{N,E}$), as converted into the horizontally-aligned inertial coordinate system, and an acceleration vector ($a_S^{N,E}$), as computed in the earth-fixed coordinate system from the satellite data.

4,930,086

METHOD AND APPARATUS FOR SEQUENTIAL PRODUCT PROCESSING WITH LIMITED PRODUCT BAR CODE READING

Yoshihito Fukasawa, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 11, 1988, Ser. No. 167,193

Claims priority, application Japan, Mar. 19, 1987, 62-65141

Int. Cl.[5] G06F *15/46*

U.S. Cl. 364—468 **6 Claims**

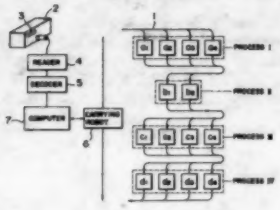
1. A method for manufacturing products produced by a plurality of processes for processing intermediary products sequentially at a plurality of processing stages to complete products while transferring said intermediary products or carriers for accommodating said intermediary products therein, each said processing stages comprising a plurality of

similar processing units capable of carrying out the process of that processing state, the method comprising the steps of:

reading discriminating codes associated with said intermediary products only prior to the first processing stage;

storing said read discrimination codes as basic information and storing corresponding processing information in regard to the processing by said processing units in memory means; and

selecting one processing unit from said plurality of processing units at a processing stage subsequent to said first processing stage on the basis of said processing information stored.



4,930,087

IMAGE FORMING APPARATUS

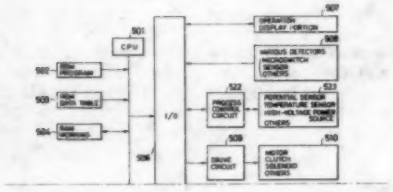
Jiro Egawa, Yokosuka; Koji Tanimoto, Yokohama, and Kunihiko Miura, Hiratsuka, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 9, 1988, Ser. No. 230,021

Claims priority, application Japan, Aug. 10, 1987, 62-198335; Aug. 13, 1987, 62-200995

Int. Cl.[5] G01D *15/00*

U.S. Cl. 364—518 **5 Claims**



1. A system for forming images comprising:

printer means for printing an image information, said printer means outputting a status signal indicating a state of said printer;

host computer means for controlling said printer in accordance with said status signal; and

interface means for providing a connection between said printer means and said host computer means, said interface means including status lines for transmitting said status signal to said host computer means and an attention line between said printer and said computer system, said attention line being indicative of at least one transition of said status signal from said printer.

4,930,088

ROTATED GRAPHIC PATTERN GENERATING SYSTEM

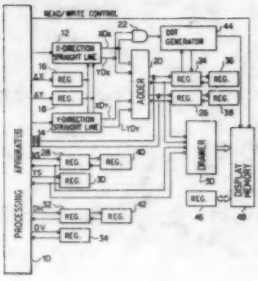
Ryuji Horiguchi, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jul. 22, 1987, Ser. No. 76,452

Claims priority, application Japan, Jul. 22, 1986, 61-173105

Int. Cl.[5] G06F *15/40*

U.S. Cl. 364—518 **3 Claims**



1. A rotated pattern generating system for generating destination coordinates from source coordinates comprising:

an X-direction straight line generator for calculating a difference in X- and Y- directions between the position of a given coordinate transformed from source coordinates to destination coordinates and a position of the next dot to be coordinate transformed, said difference determined by the difference in the source coordinates between a given dot and the next dot to be transformed and a required rotational angle θ;

a detector connected to the X-direction straight line generator for detecting whether or not a residual pattern occurs each time the X-direction straight line generator generates an output; and

a dot generator responsive to the output of the detector to generate, on the position of the residual pattern the same dot information as that of the dot adjacent to the residual pattern position in the destination coordinate when a residual pattern is detected by said detector.

4,930,089

METHOD FOR IDENTIFYING COORDINATE DATA FOR SELECTED LOCATIONS ON PREPRINTED PAPER AND SUPPLYING THE DATA TO A PRINTER FOR PRINTING AT CORRESPONDING LOCATIONS

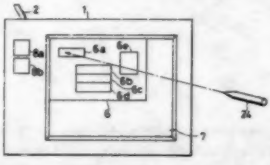
Motonobu Hatakeyama; Kohtaroh Yoshimura; Hidenori Naoi, and Nobuo Wakasugi, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Mar. 10, 1988, Ser. No. 166,478

Claims priority, application Japan, Mar. 11, 1987, 62-54209; May 18, 1987, 62-120723

Int. Cl.[5] G06F *3/03*

U.S. Cl. 361—519 **13 Claims**



1. A method for inputting, into a printer for storage in a

memory means in the printer memory, printing initiation positions for on a standard preformed paper comprising the steps of:

providing a printing format input device, which is equipped with a touch panel capable of entering coordinate data through contact with a touch pen onto the panel,

superimposing the touch panel with the standard preformed paper which has with a printing format already preliminarily printed on the paper; and

entering, by means of the touch pen, coordinate data of the printing initiation positions of the printing format through the touch panel;

whereby the input coordinate data are input into the printer as the printing format data.

4,930,090

PEN RECORDER MOVED ACCORDING TO A DIGITAL SERVO CONTROLLER

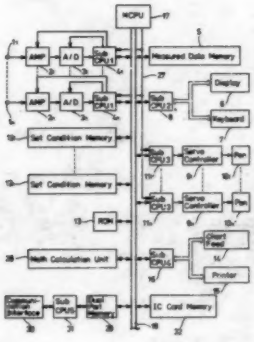
Toshio Kimura; Yoshihiro Okano; Masahiro Otani, and Shigenobu Miyamoto, all of Tokyo, Japan, assignors to Yokogawa Electric Corporation, Tokyo, Japan

Filed Sep. 21, 1988, Ser. No. 247,402

Claims priority, application Japan, Jan. 14, 1988, 63-3538[U]; Feb. 29, 1988, 63-47157

Int. Cl.[5] G01D *15/16*

U.S. Cl. 364—520 **14 Claims**



1. A pen recorder apparatus comprising

at least one pen for writing on a chart;

measuring means for converting a measured analog signal into a digital signal;

man-machine interface means operated in an interactive mode with a display for inputting set conditions to said pen recorder apparatus;

servo controller means for moving said at least one pen in relation to said chart in accordance with a magnitude of said measured analog signal;

chart feed means for feeding said chart under said set conditions;

a first bus;

a main central processing unit; and

a plurality of subsidiary central processing units connected through said first bus to said main central processing unit, for performing dispersive control of said pen recorder apparatus; wherein

each of said plurality of subsidiary central processing units is a semiconductor integrated circuit comprising

a subsidiary central processing element,

an element for controlling said measuring means,

an element for controlling said man-machine interface means,

an element for controlling said servo controller means,

an element for controlling said chart feed means, and

a second bus interconnecting said elements to each other.

4,930,091

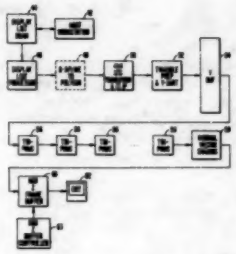
TRIANGLE CLASSIFICATION SETUP METHOD AND APPARATUS FOR 3-D GRAPHICS DISPLAY SYSTEM

Brian D. Schroeder, Lowell, Mass., and Michael F. Deering, Los Altos, Calif., assignors to Schlumberger Systems, Inc., Sunnyvale, Calif.

Filed Nov. 4, 1987, Ser. No. 116,999

Int. Cl.[5] G06F *3/14*

U.S. Cl. 364—522 **13 Claims**



1. A method for classifying triangles based upon the coordinates of the vertices of a triangle, comprising the steps of:

determining a plurality of parameters describing a triangle which can be calculated from said coordinates of said vertices, wherein one set of said parameters is a plurality of values indicating whether a particular edge of said triangle crosses an integral x or y boundary;

determining a triangle classification for every combination of at least a portion of said parameters;

storing in a look-up table said determined triangle classifications with said combinations of parameters as addresses;

calculating a plurality of parameters of said triangle from said coordinates of said vertices; and

determining the classification of said triangle by applying at least a portion of said parameters to said look-up table.

4,930,092

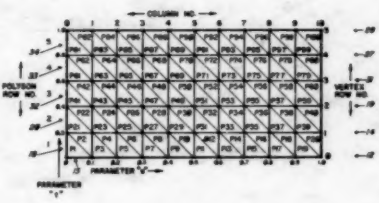
POLYGON DISPLAY APPARATUS AND METHOD

Shirley L. Reilly, Hillsboro, Oreg., assignor to Auto-trol Technology Corporation, Denver, Colo.

Filed Jan. 20, 1987, Ser. No. 5,252

Int. Cl.[5] G06F *15/62*

U.S. Cl. 364—522 **26 Claims**



1. A method of representing an object having a surface for graphical display on a video display screen by controlling values of electrical signals that represent coordinates of vertices that define points on the surface of said object, comprising the steps of:

selecting equations having at least two parameters for defining said coordinates of said vertices;

identifying a first of said parameters and keeping the value of same at a first amount;

factoring said equations to express each of said coordinates in terms of a first constant and of a variable that is a function of a second one of said parameters;

sequentially solving said equations by substituting a predetermined series of values for said second one of said parameters to define first values for each of said coordinates for each vertex in a series of said vertices that form a first row of said points on the surface of said object;

controlling the values of certain of said electrical signals by using said first values for each of said coordinates in said first row to cause said signals to represent each of said coordinates of said vertices that form said first row of points;

repeating said factoring and solving steps using a second amount for the value of said first parameter and the same predetermined series of values for said second one of said parameters to define second values for each of said coordinates for each vertex in a second series of said vertices that form a second row of said points on the surface of said object;

controlling the values of certain other ones of said electrical signals by using said second values for each of said coordinates in said second row to cause said other signals to represent each of said coordinates of said vertices that form said second row of points;

the entire surface of said object being represented by more than two of said rows;

selecting said electrical signals that represent at least a first coordinate of first and second ones of said vertices at one end of said first row;

selecting said electrical signal that represents at least said first coordinate of one said vertex from the corresponding end of said second row;

said selecting steps identifying those electrical signals that represent a first polygon that defines certain of said points on the surface of said object to be displayed;

selecting said electrical signal that represents at least said first coordinate of a next vertex of said second row and discarding said electrical signal that represents said coordinate of said first vertex of said first row to generate and store those electrical signals that represent a next polygon adjacent said last-represented polygon for defining an additional point on the surface of said object; and

displaying said object on said video display screen in response to said signals that represent said first and next polygons.

4,930,093

METHOD OF MEASURING MESSAGE RESPONSE TIME PERFORMANCE OF A DATA PROCESSING SYSTEM INCLUDING DATA TERMINALS

James S. Houser, Cambridge, and Don C. Finfrock, both of Cambridge, Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed Aug. 1, 1988, Ser. No. 226,923
Int. Cl.[5] G04F *10/00*; G05B *23/00*
U.S. Cl. 364—551.01 **12 Claims**

1. A method of measuring message response time performance of a data processing system which includes a central processing unit having data storage, data processing and communications means and also including a plurality of data terminals each having communications means, timing means and means for recording time data, comprising the following steps:

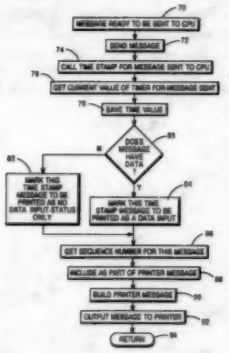
sending a first system message to the central processing unit from a data terminal, said message including a sequence number previously provided to said data terminal by said central processing unit;

generating a first timing message by said data terminal at substantially the same time that said first system message is sent to said central processing unit, said first timing message including time data taken from the timing means in said data terminal at the time that said first data message is sent to said central processing unit from said data terminal, also including the sequence number included in said system message, and further including an identification of the message as being sent from said terminal to said central processing unit;

recording said first timing message;

sending a second system message from said central processing unit to said data terminal in response to said first system message, said second system message including a sequence number bearing a predetermined relationship to the sequence number contained in said first system message;

generating a second timing message by said data terminal at substantially the same time that said second system message is received by said data terminal, said second timing


MESSAGE READY TO BE SENT TO CPU
SEND MESSAGE
CALL TIME STAMP FOR MESSAGE SENT TO CPU
GET CURRENT VALUE OF TIMER FOR MESSAGE SENT
SAVE TIME VALUE
DOES MESSAGE HAVE DATA ?
N
Y
MARK THIS TIME STAMP MESSAGE TO BE PRINTED AS NO DATA INPUT STATUS ONLY
MARK THIS TIME STAMP MESSAGE TO BE PRINTED AS A DATA INPUT
GET SEQUENCE NUMBER FOR THIS MESSAGE
INCLUDE AS PART OF PRINTER MESSAGE
BUILD PRINTER MESSAGE
OUTPUT MESSAGE TO PRINTER
RETURN

message including time data taken from the timing means in said data terminal at the time that said second system message is received by said data terminal, also including the sequence number contained in said second system message, and further including an identification of the message as being sent from said central processing unit to said data terminal;

recording said second timing message;

associating said first timing message with said second timing message by virtue of the predetermined relationship between the sequence numbers included in said first and second timing messages; and

comparing the time data included in said first and second timing messages to establish the total time elapsed between the sending of said first system message by said data terminal and the receipt of said second system message by said data terminal.

4,930,094

VEHICLE SERIAL BUS, MECHANICAL INSTRUMENT CLUSTER ODOMETER THEREFOR

William V. Luitje, Ann Arbor, and John M. McCambridge, Northville, both of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

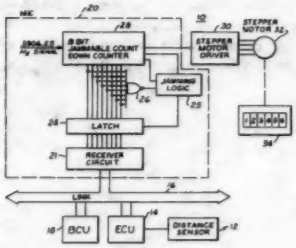
Filed Jul. 11, 1988, Ser. No. 217,596
Int. Cl.[5] G01C *22/00*; G06F *15/20*
U.S. Cl. 364—561 **7 Claims**

1. A firmware/hardware analog odometer unit for deriving a stepper motor pulse rate for a stepper motor of an analog odometer from a digital signal derived from a series of ON and OFF ground switch closures in proportion to the distance traveled by a vehicle provided by a distance sensor unit coupled to a drive train of a vehicle, said system comprising:

(a) first computing means connected to the distance sensor

unit for converting the series of switch closures of the digital signal into a series of integer distance counts numbers as the vehicle travels at various speeds over various distances, each distance counts number in the series representing an accumulated count of the switch closures during a chosen first time interval;

(b) second computing means connected to said first computing means for computing from each of the distance counts numbers a corresponding binary stepper motor rate number during a chosen second time interval representing the



rate at which to issue stepper motor pulses sufficient to cause a rotor of the stepper motor to rotate substantially continuously as the vehicle moves; and

(c) stepper motor driver means connected to said second computing means for using said binary rate numbers to derive a series of pulses at a rate useful in driving the rotor of the stepper motor in response to changes in the value of the series of said distance count numbers so that the inertia of the rotor and a torque of the stepper motor produces generally regular odometer readings.

4,930,095

OUTPUT CORRECTION SYSTEM FOR ANALOG SENSOR

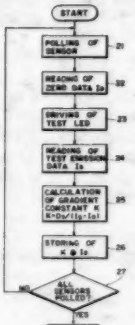
Sadataka Yuchi; Haruchika Machida, both of Sagamihara; Naoya Matsuoka, and Masamichi Kikuchi, both of Yokohama, all of Japan, assignors to Hochiki Corp., Tokyo, Japan

Filed Apr. 23, 1986, Ser. No. 854,937

Claims priority, application Japan, Apr. 26, 1985, 60-90093

Int. Cl.[5] G06F *15/20*; G08B *17/10*

U.S. Cl. 364—571.01 **15 Claims**



1. An analog output test and correction system for an analog detector which outputs an analog signal having a varying value representative of the value of a detectable variable physical quantity monitored and detected by the detector, the detector having means for developing a test and sensing signal for sensing and detecting the physical quantity and having means responsive to the test and sensing signal for developing as a function of the value of the physical quantity the analog output signal representative of the physical quantity, the test and correction system comprising, a control section for receiving the analog output of the detector under a condition where the output is representative of a condition where the physical quantity is at zero value and an output from the analog detector under a simulated condition in which the value of the physical quantity is a simulated predetermined value at which the detector detects the physical quantity, said control section having a first arithmetic section for calculating a gradient of values on the basis of the output under the zero value condition and the output under the simulated condition, a storage section for storing said zero value condition output and said gradient of values, and a second arithmetic section for calculating a value of the physical quantity corresponding to the predetermined output value from the analog detector on the basis of the detector output characteristics defined by said zero value condition outputs and said gradient of values of outputs, and means including means in said control section for adjustably correcting and maintaining said test and sensing signal at a level effective to maintain the detector output corresponding to the simulated condition even if said characteristics of the detector change, whereby the detector detects the physical quantity when said predetermined value thereof obtains even if the detector characteristics change.

4,930,096

DATA-TRANSMITTING APPARATUS HAVING CONNECTING PLUG

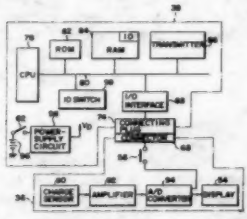
Giichiro Shimizu; Misao Shimizu; Hajime Takeuchi; Toshiharu Okuyama, and Yoshio Wakatuski, all of Tokyo, Japan, assignors to Man Design Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 111,672, Oct. 23, 1987, abandoned. This application May 2, 1989, Ser. No. 348,175

Claims priority, application Japan, Jan. 22, 1987, 62-12702; Feb. 6, 1987, 62-24786

Int. Cl.[5] G01B *7/18, 7/30*

U.S. Cl. 364—550 **7 Claims**



1. A data-transmitting apparatus which is connectable to digital output terminal of a digital measuring means for outputting a digital measured value, said digital measuring means including said digital output terminal, said data transmitting apparatus comprising:

housing means detachably mounted to the digital measuring means;

connecting plug means provided on said housing means for connecting with the digital measuring means digital output terminal and for receiving digital data output from the digital output terminal of the digital measuring means;

ID number setting means for storing at least one digit of desired digital data supplied from the digital measuring means through the connecting plug means as an ID number for identifying the data-transmitting apparatus;

microcomputer means provided with said housing means and coupled to said ID number setting means, for generating a serial measured data message including the digital

data supplied from the digital measuring means through the connecting plug means as a measured result of the digital measuring means; and

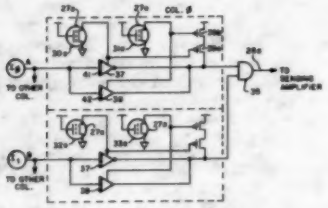
data transmitter means provided within said housing means and connected to said microcomputer means, for modulating an RF carrier signal with the serial measured data message formed in said microcomputer means and for radiating said modulated RF carrier signal to an external apparatus in the form of a radio message.

4,930,097

ARCHITECTURE FOR AN IMPROVED PERFORMANCE OF A PROGRAMMABLE LOGIC DEVICE

Gregory W. Ledenbach, Orangevale, and Michael J. Allen, Rescue, both of Calif., assignors to Intel Corporation, Santa Clara, Calif.

Filed Dec. 30, 1988, Ser. No. 292,464
Int. Cl.[5] H03K *19/177*
U.S. Cl. 364—716 18 Claims



1. In a programmable logic device (PLD) having a plurality of inputs and a plurality of outputs, an apparatus for operating on said inputs according to a stored program, comprising:

a plurality of memory cells for storing said program;

a plurality of buffers, wherein each of said buffers is coupled to receive a selective one of said inputs and, if enabled, provides a corresponding output;

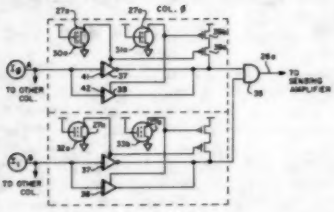
for each said buffer, a corresponding one of said memory cells is coupled to enable said buffer for passing said input signal as said corresponding output, wherein enablement of each said buffer is determined by a stored state of its corresponding memory cell and wherein said corresponding output from each said buffer provides for said plurality of outputs from said PLD.

4,930,098

SHIFT REGISTER PROGRAMMING FOR A PROGRAMMABLE LOGIC DEVICE

Michael J. Allen, Rescue, Calif., assignor to Intel Corporation, Santa Clara, Calif.

Filed Dec. 30, 1988, Ser. No. 292,462
Int. Cl.[5] H03K *14/177*
U.S. Cl. 364—716 7 Claims



1. In a programmable logic device (PLD) having a plurality of inputs and a plurality of outputs and a memory array for storing a program, an apparatus for operating on said inputs according to a stored program, comprising:

a plurality of memory cells comprising said memory array for storing said program;

a plurality of registers serially arranged, and wherein each register is coupled to its corresponding memory cell for latching a stored state of its memory cell;

a plurality of buffers, wherein each of said buffers is coupled to receive a selective one of said inputs and, if enabled, provides a corresponding output;

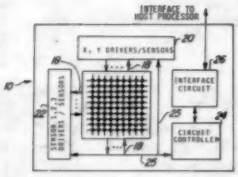
each said buffer also being coupled to its corresponding memory cell through its corresponding register such that enablement of said buffer is determined by said stored state of its corresponding memory cell.

4,930,099

WAVEFRONT VECTOR CORRELATION PROCESSOR AND METHOD

Patrick F. Castelaz, Yorba Linda, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Oct. 7, 1988, Ser. No. 255,053
Int. Cl.[5] G06G *7/12*
U.S. Cl. 364—820 17 Claims



1. In a processor having an array of similar processing elements, each processing element connected to neighboring processing elements, and capable of responding to an input pulse with an output pulse, the improvement comprising:

said processing elements being disposed in said array in positions that represent vectors in a vector space;

memory means within each processing element for storing a classification;

logic means within each processing element for transmitting a single pulse to each of said connected neighboring processing elements upon receipt of a pulse;

address means connected to each of said processing elements for permitting addressing of said processing elements;

controller means connected to said address means for transmitting signals to selected processing elements, said signals including classifying signals for assigning classifications to said selected processing elements;

said controller means also capable of transmitting a pulse to one or more selected cells having a first classification; and

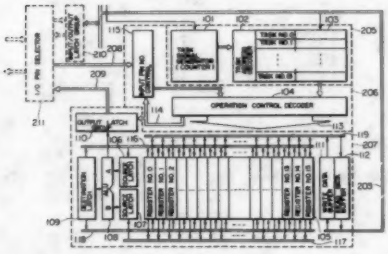
detection means for detecting when processing elements of a second classification receive pulses from one or more neighboring processing elements, wherein the time between transmission of a pulse from said processing element having a first classification and the receipt of said pulse by a processing element of a second classification provides a vector-to-vector correlation between the two processing elements.

4,930,100

PROGRAMMABLE PULSE INPUT/OUTPUT PROCESSING UNIT HAVING REGISTER TYPES SPECIFIED BY INSTRUCTIONS

Shigeki Morinaga, 10-12, Hanayamacho-2-chome, and Mitsuru Watabe, 19-5-302, Isbinazakacho-1-chome, both of Hitachi-shi, Japan

Continuation of Ser. No. 793,350, Oct. 31, 1985, abandoned. This application Dec. 14, 1988, Ser. No. 284,388
Claims priority, application Japan, Nov. 2, 1984, 59-230202
Int. Cl.[5] G06F 7/02; H03K 21/00
U.S. Cl. 364—900 27 Claims



1. A counter/timer device for use with a microcomputer to perform counter/timer operations for said microcomputer comprising:

a plurality of I/O terminal pins for receiving signals from and sending signals to said microcomputer;

task instruction generating means for successively generating task instructions specifying counter/timer operations, registers to be used in performing said counter/timer operations and I/O terminal pins to be employed in receiving signals from and sending signals to said microcomputer in performing said counter/timer operations;

counter/timer operation means coupled to said I/O terminal pins for performing counter/timer operations including (a) a register group made up of a plurality of registers each being selectively programmable to perform any of a plurality of register functions necessary for said counter/timer operations, said plurality of register functions including a counter/timer function, a compare function such that the number of counter/timer function registers, compare function registers and capture function registers can be freely changed to accommodate various counter/timer operations and a capture function, (b) arithmetic unit means for performing an arithmetic/logic operation on the basis of data from said register group, and (c) bus means for transferring data between said register group and said arithmetic unit means; and

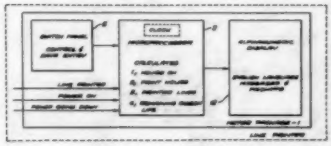
task instruction control means connected to said task instruction generating means and said counter/timer operation means, and being responsive to a task instruction generated by said task instruction generating means, for specifying (i) at least one I/O terminal pin for receipt of signals from or for supplying signals to said microcomputer and (ii) at least one of said plurality of registers included in said register group of said counter/timer operation means to be used for a particular counter/timer operation which is responsive to a signal received on said specified I/O terminal pin or which supplies a resultant signal to said specified I/O terminal pin, and for causing said arithmetic unit means to perform an arithmetic/logic operation corresponding to said particular counter/timer operation specified by said task instruction on the basis of data contained in said at least one of said plurality of registers.

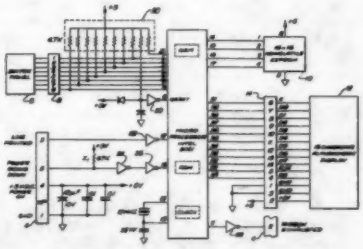
4,930,101

MICROPROCESSOR-CONTROLLED METER PACKAGE FOR A PRINTER

Yuen W. Wong, Glendale; Doina Mazilu, Woodland Hills, and Paul O. Amdahl, Granada Hills, all of Calif., assignors to Dataproducts Corporation, Woodland Hills, Calif.

Filed May 9, 1986, Ser. No. 861,527
Int. Cl.[5] G06F 9/00
U.S. Cl. 364—900 30 Claims





1. A meter, for use with an electrical printer that produces both a POWER ON signal which indicates when active that a printer operating voltage is on and a LINE PRINTED signal which indicates when active that a line is printed, comprising:

(a) POWER ON and LINE PRINTED sensing inputs for respectively receiving the POWER ON and LINE PRINTED signals from a printer;

(b) display means having a display input, for converting signals received at the display input into a corresponding meter display; and

(c) microprocessor means (i) having clock means for generating timing pulses, ROM and RAM memories, a program stored in the ROM memory, and HOURS ON and KILOLINES PRINTED variables stored in the RAM memory, and (ii) coupled to the sensing inputs to receive the POWER ON and LINE PRINTED signals and coupled for transmission to the display input;

the microprocessor means by executing the program being responsive to (i) the POWER ON signal and the timing pulses for incrementing the HOURS ON variable for each hour the printer operating voltage is on; (ii) the LINE PRINTED signal for incrementing the KILOLINES PRINTED variable for each 1000 times a line is printed; and (iii) the currently stored HOURS ON and KILOLINES PRINTED variables for transmitting their values to the display input for conversion by the display means to corresponding meter displays of HOURS ON and KILOLINES PRINTED.

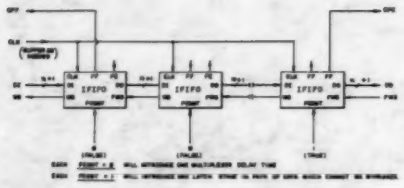
4,930,102
DYNAMIC ACTIVITY-CREATING DATA-DRIVEN COMPUTER ARCHITECTURE

Glenn A. Jennings, Riverside, Calif., assignor to The Regents of the University of California, Alameda, Calif.

Division of Ser. No. 490,154, Apr. 29, 1983. This application Oct. 6, 1986, Ser. No. 914,738

Int. Cl.[5] G11C *7/00*

U.S. Cl. 364—900 **10 Claims**



1. In a queue structure having FIFO organization comprising a plurality of stages into which data can be placed at input points and means for removing data at a plurality of output points from said queue structure upon the occurrence of respective clock pulses of a clock line to which it is synchronized and by which it is driven, the improvement comprising:

(a) status means for indicating the presence of data in said stages and interconnecting the stages for passing the status of each stage in the queue to the stage in front of it and behind it between the clock pulses;

(b) shifting means within each stage interconnecting the stages for shifting data between stages toward the output points over unused stages between clock pulses using combinatorial logic whereby the availability of data at the output points during the clock pulses is increased;

(c) at least one backward combinatorial logic circuit and at least one forward combinatorial logic circuit housed within each stage, the backward and forward combinatorial logic circuits being bidirectionally linked to each for data transfer and to said data shifting means;

(d) each of said combinatorial logic circuits being connected to at least one other of said stages, said forward logic circuit being linked to at least a forward stage and said backward logic circuit being linked to at least a forward stage, and said backward logic circuit being linked to at least a preceding stage, each logic circuit being so linked by stage-connecting signal paths; and

(e) said shifting means including: (1) a plurality of shaft latches within each stage, each latch capable of storing at least one data bit; (2) a plurality of bypass lines within each stage for bypassing said shift latches; and (3) a plurality of data lines connecting said shift latches and bypass lines to adjoining forward and backward other of said stages.

4,930,103
DATA TRANSMISSION METHOD IN A DIGITAL TRANSMISSION NETWORK AND APPARATUS FOR IMPLEMENTING SAME

Gerhard Geiger, Schliersee, and Michael Strafner, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Continuation of Ser. No. 620,618, Jun. 14, 1984. This application Oct. 16, 1986, Ser. No. 918,692

Claims priority, application Fed. Rep. of Germany, Aug. 12, 1983, 3329228

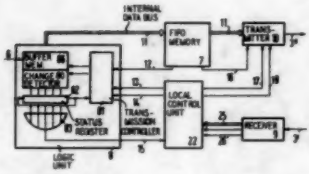
Int. Cl.[5] G06F *11/00, 11/28*

U.S. Cl. 364—900 **17 Claims**

1. A data transmission method for use in a hierarchically organized digital transmission network having at least one higher ranking unit and a plurality of lower ranking units connected thereto via a data bus system, said lower ranking units respectively exchanging data with a plurality of terminals via line connections, said data being forwarded to said higher ranking unit after a request/acknowledgement procedure, said method comprising the steps of:

(a) checking incoming data on said line connections at said lower ranking units in a regular routine for determining whether said incoming data has changed in comparison to data from an immediately preceding check;

(b) if said checking step shows a change in said incoming data, generating a flag and allocating said flag to the line connection from which changes incoming data is received;



(c) said higher ranking unit successively enabling said lower ranking units for transmitting data to said higher ranking unit;

(d) transmitting at least the changed data identified with said flag from said lower ranking unit to said higher ranking unit; and

(e) if no change in incoming data is shown by said check, transmitting an acknowledgement signal from said lower ranking unit to said higher ranking unit.

4,930,104
CONTENT-ADDRESSED MEMORY

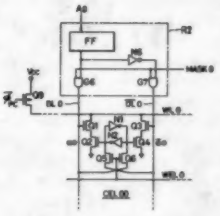
Norio Nakagawa, Kodaira; Katsuaki Takagi, Higashimurayama, and Hirokazu Aoki, Hachiohji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 909,928, Sep. 22, 1986, Pat. No. 4,831,586. This application May 8, 1989, Ser. No. 349,402

Claims priority, application Japan, Sep. 20, 1985, 60-206420

Int. Cl.[5] G11C *13/00, 11/40*

U.S. Cl. 365—49 **9 Claims**



2. An associative memory formed on a semiconductor substrate comprising:

means for generating input data;

a first memory coupled to receive said input data, said first memory including a plurality of storage sets each of which stores first data and includes means for comparing the input data with the first data stored therein and for generating a coincidence signal when the input data is coincident with the first data stored therein, and a first line to which the coincidence signal is applied;

a memory array including a plurality of memory cells and a plurality of selecting lines each of which is coupled to the memory cells; and

selecting means for selecting one of said plurality of select-

ing lines, said selecting means having inputs coupled to the first lines, respectively, and outputs coupled to said plurality of selecting lines, wherein said selecting means includes first means for selecting only one of said plurality of selecting lines in accordance with a predetermined rank of said first lines when said selecting means receives at said inputs a plurality of the coincidence signals on said first lines and for selecting one of said plurality of selecting lines in response to receipt of one coincidence signal on said first lines.

4,930,105

NONVOLATILE SEMICONDUCTOR MEMORY DEVICE WITH A DOUBLE GATE STRUCTURE

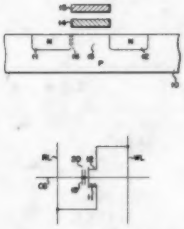
Osamu Matsumoto; Tadashi Maruyama; Hiroyoshi Murata, all of Yokohama; Isao Abe, Kawasaki; Tomohisa Shigematsu, Yokohama; Kazuyoshi Shinada, Yokohama; Yasoji Suzuki, Yokohama, and Ichiro Kobayashi, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 7, 1988, Ser. No. 178,609

Claims priority, application Japan, Apr. 9, 1987, 62-87482

Int. Cl.[5] G11C *7/00, 11/40;* H01L *29/78*

U.S. Cl. 365—185 **16 Claims**



1. A nonvolatile semiconductor memory device comprising:

a memory cell including a first conductivity type semiconductor substrate, first and second diffusion layers of a second conductivity type formed in said substrate, a channel region formed in the surface region of said substrate and located between said first and second diffusion layers, a floating gate electrode formed on said channel region, a control gate electrode formed on said floating gate electrode, and means for lessening an electric field concentration only between said first layer and said channel region;

a control gate line for supplying predetermined voltages to said control gate electrode, in a read mode and in a write mode;

a read line connected to said first diffusion layer, for reading out data from said memory cell; and

a write line connected to said second diffusion layer, for writing data into said memory cell.

4,930,106

DUAL CACHE RAM FOR RAPID INVALIDATION

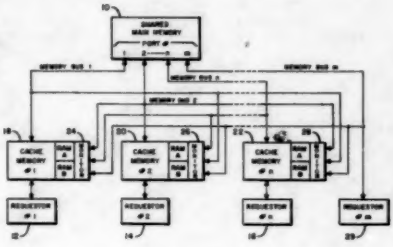
Michael Danilenko, West St. Paul; Clarence W. Dekarske, St. Paul Park, and John E. Larson, Eagan, all of Minn., assignors to Unisys Corporation, Blue Bell, Pa.

Filed Aug. 29, 1988, Ser. No. 237,817

Int. Cl.[5] G11C *15/00*

U.S. Cl. 365—189.01 **2 Claims**

1. Storage means for storing validity bits in a multiprocessor cache memory comprising a plurality of random access storage means, switch means for initially enabling a first one of said plurality of random access storage means thereby enabling it to function as an active store of said validity bits in an operating cache memory, and for disabling the others of said plurality of random access storage means from functioning as an active store of said validity bits for said operating cache memory, said switch means also being operable to disable said first one of said random access storage means and to enable one other of said plurality of said random access storage means for function as an active store of said validity bits upon receipt of an invalidate signal by said cache memory means, and write means for



writing into memory locations of said first one of said random access storage means following the disablement of said first one of said random access storage means by said switch means until all of said memory locations are at a common logic level.

4,930,107

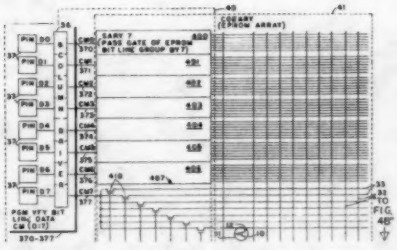
METHOD AND APPARATUS FOR PROGRAMMING AND VERIFYING PROGRAMMABLE ELEMENTS IN PROGRAMMABLE DEVICES

Yiu-Fai Chan, Saratoga, and Chuan-Yung Hung, Cupertino, both of Calif., assignors to Altera Corporation, San Jose, Calif.

Filed Aug. 8, 1988, Ser. No. 229,852

Int. Cl.[5] G11C *7/00*

U.S. Cl. 365—189.08 **24 Claims**



1. Apparatus for programming a programmable integrated circuit having at least one programmable logic array, said at least one programmable logic array having at least m word lines, at least n bit lines, and at least m×n programmable interconnections, said apparatus comprising:

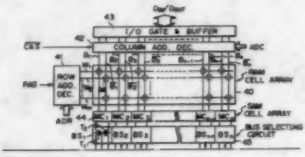
means for applying programming data to said array; and

means for providing serial address information to said array for indicating, at random, for which of said programmable interconnections said programming data is intended.

4,930,108
SEMICONDUCTOR MEMORY DEVICE WITH SERIAL ACCESS MEMORY

Tsutomu Sogiyama, Kasugai, Japan, assignor to Fujitsu Limited, Kanagawa and Fujitsu VLSI Limited, Aichi, both of, Japan

Filed Dec. 1, 1988, Ser. No. 278,502
Claims priority, application Japan, Dec. 4, 1987, 62-307936
Int. Cl.[5] G11C 7/00
U.S. Cl. 365—230.02 **15 Claims**



1. A semiconductor memory device comprising:

a first memory cell array having a plurality of random access memory cells arrayed in a row direction and a column direction;

a second memory cell array operatively connected to said first memory cell array and having at least serial access memory cells corresponding to a single row of said first memory cell array, said serial access memory cells having a first part corresponding to odd number addresses and a second part corresponding to even number addresses, one of said first and second parts including at least one specific serial access memory cell;

a first data bus allocated to said first part;

a second data bus allocated to said second part;

a third data bus allocated to said at least one specific serial access memory cell; and

a bus switching control circuit for controlling a connection of each of said serial access memory cells to one of the data buses and selecting one of the data buses to connect the selected data bus to an external terminal of said semiconductor memory device,

said bus switching control circuit outputting each of bit data in said serial access memory cells serially and alternately to said first and second data buses, when a plurality of transfer data blocks are serially read out from said second memory cell array, outputting a bit data in said at least one specific serial access memory cell corresponding to a head or last address in each of said transfer data blocks to said third data bus.

4,930,109
METHOD AND APPARATUS OF MEASURING ULTRASONIC TIME TRAVEL INFORMATION OBTAINED FROM LOGGING OPERATIONS IN A WELL BOREHOLE

Donald G. Kyle, Plano, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

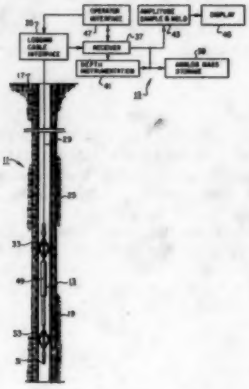
Filed Dec. 29, 1988, Ser. No. 291,633
Int. Cl.[5] G01V 1/40
U.S. Cl. 367—27 **11 Claims**

1. A method of measuring time of travel information of an acoustic return obtained from an ultrasonic logging apparatus operating in a well borehole, said ultrasonic logging apparatus generating an acoustic waveform and receiving the acoustic return from said generated acoustic waveform, said acoustic return having a peak amplitude, said time of travel of said acoustic return being measured from said generated acoustic waveform, comprising the steps of:

(a) providing ultrasonic receiver means and providing threshold detection means for determining a threshold level of said acoustic return;

(b) receiving said acoustic return with said receiver means and detecting a threshold amplitude of said acoustic return with said threshold detection means;

(c) measuring a first time interval from said generated acoustic waveform to said detected threshold amplitude;



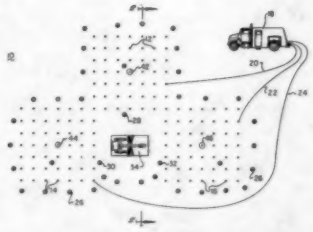
(d) detecting said peak amplitude of said return, measuring a second time interval from said detected threshold amplitude to said peak amplitude;

(e) combining said first and second time intervals to obtain the time of travel of said acoustic return.

4,930,110
METHOD FOR CONDUCTING THREE-DIMENSIONAL SUBSURFACE SEISMIC SURVEYS

Douglas L. Bremner, Richardson; Gary A. Crews, and James A. Musser, both of Plano, all of Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Jul. 13, 1988, Ser. No. 218,662
Int. Cl.[5] G01V 1/20, 1/36
U.S. Cl. 367—56 **3 Claims**



1. A method for conducting three-dimensional subsurface seismic surveys comprising the steps of:

disposing a plurality of seismic receivers in a plurality of orthogonally uniform patterns about selected points on the surface of the earth wherein gaps are formed between said plurality of orthogonally uniform patterns;

imparting seismic energy into the earth at a plurality of locations, each of said locations disposed in a particular azimuthal direction and a selected distance from said selected points;

simultaneously recording the responses of each of said plurality of seismic receivers to said seismic energy imparted at each of said plurality of locations;

characterizing the time and spatial nature of unwanted noise within said recorded responses by utilizing the uniform sampling intervals provided by said orthogonally uniform patterns; and

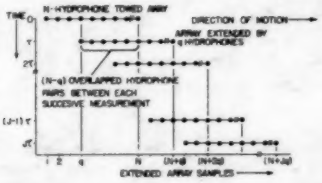
processing the said recorded responses to remove said characterized unwanted noise.

4,930,111

OVERLAP CORRELATOR SYNTHETIC APERTURE PROCESSOR

Edmund J. Sullivan, Portsmouth, R.I., and Stergios Stergiopoulos, Athens, Greece, assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 30, 1989, Ser. No. 374,679
Int. Cl.[5] G01S *3/80*
U.S. Cl. 367—130 **3 Claims**



1. A passive acoustic signal processing apparatus, comprising:

a N element physical hydrophone towed acoustic array, said array having a leading end, a trailing end and further being in motion at a preselected velocity; and

signal processing means, electrically connected to said N element moving towed array, for receiving J+1 sequential sets of N time sampled electrical signals from said N physical hydrophones of said towed array, the sampling time period τ being preselected such that said array has moved a distance equal to "q" hydrophone positions and therefore each signal set having the trailing N−q hydrophones of said N element array spatially overlapping the position previously occupied by the leading N−q hydrophones of said N element array during the previous measurement thus exploiting the N element finite physical aperture of the array in order to provide a direct estimate of a phase correction factor, and producing J such phase correction factors from said J+1 measurements, said J phase correction factors then being applied to correct said measurements so as to provide N physical hydrophone outputs plus Jq synthetic hydrophone outputs therefrom;

said signal processing means thereby providing a towed array having an effective aperture N+Jq which is substantially longer than the physical aperture N of said towed array.

4,930,112

SEMICONDUCTOR DEVICE HAVING A VOLTAGE LIMITER

Hitoshi Tanaka, Tachikawa; Ryoichi Hori, Tokyo; Kiyoo Itoh, Higashikurume; Katsutaka Kimura, Sagamihara, and Katsuhiro Shimohigashi, Musashimurayama, all of Japan, assignors to Hitachi, Ltd. and Hitachi VLSI Engineering Corporation, both of Tokyo, Japan

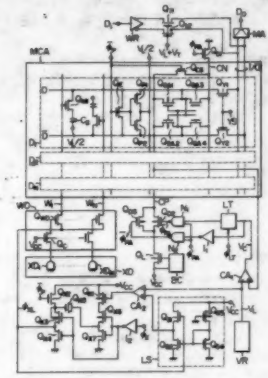
Filed Nov. 24, 1986, Ser. No. 934,546
Claims priority, applicaton Japan, Nov. 22, 1985, 60-251213
Int. Cl.[5] G11C *7/00*; G060 *11/00*
U.S. Cl. 365—226 **27 Claims**

1. A semiconductor device comprising:

a first and a second circuit coupled to at least one external power source; and

a plurality of voltage converter means each transforming a voltage of the external power source into an output voltage different than the voltage of the external power source,

wherein at least said first circuit is coupled to said external power source through one of said voltage converter means so that said first circuit is driven by the output voltage of said one voltage converter means, and further wherein said voltage converter means includes control means coupled to receive a first signal for controlling the output voltage of said one voltage converter means based on said first signal which corresponds to a second signal,



which second signal controls operation of said first circuit, thereby controlling load driving power of said one voltage converter means,

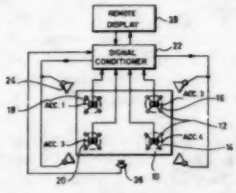
wherein said second signal is a load driving control signal applied to said first circuit to control the operation of said first circuit, and wherein said first signal is synchronized to said second signal and is applied to said voltage converter means to control the operation of said voltage converter means to be synchronized with the operation of the first circuit.

4,930,113

SUPPRESSION OF AIR-COUPLED NOISE PRODUCED BY SEISMIC VIBRATORS

John J. Sallas, Plano, Tex., assignor to Halliburton Geophysical Services, Inc., Dallas, Tex.

Filed Mar. 30, 1989, Ser. No. 331,615
Int. Cl.[5] G01V *1/02*
U.S. Cl. 367—190 **2 Claims**



1. Method for suppressing the propagation of sound waves in air resulting from the vibration of a baseplate on a seismic vibrator, comprising the steps of:

(a) attaching transducer means to the upper surface of the baseplate;

(b) activating the transducer means to generate a signal representing the acceleration of the baseplate;

(c) conditioning the signal received from the transducer means to produce a conditioned signal which is substantially in antiphase with and substantially proportional to the acceleration of the baseplate;

(d) feeding the conditioned signal to a least one loudspeaker mounted in proximity to the baseplate so that said loudspeaker produces and sound waves which are substantially in antiphase with and substantially proportional to the acceleration of the baseplate;

(e) measuring sound waves in the air at a prescribed distance from said baseplate and delivering a signal correlative thereto;

(f) determining the level of attenuation of sound waves in the air in response to said measured signal; and

(g) displaying the level of attenuation.

4,930,114

TRACK JUMP OPERATION CONTROL APPARATUS IN A DISK PLAYER

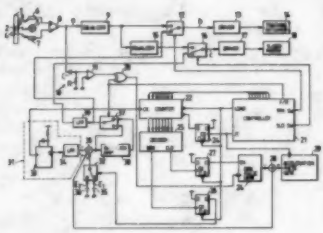
Kiyoshi Tateishi, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Jun. 8, 1988, Ser. No. 203,838

Claims priority, application Japan, Aug. 6, 1987, 62-196874

Int. Cl.[5] G11B *7/00*; H04N *21/08*

U.S. Cl. 369—32 **9 Claims**



1. A track jump operation control apparatus in a disk player, said control apparatus comprising:

fine adjustment means for finely adjusting a relative position of an information detecting point of a pickup relative to a recorded disk to thereby make the information detecting point follow a reading track of the recorded disk;

rough adjustment means for roughly adjusting said relative position of said information detecting point so that said information detecting point is positioned within a controllable region of said fine adjustment means:

speed detection means for producing a speed detection signal corresponding to a radial moving speed of said information detection point relative to said recorded disk;

speed error signal generation means for generating a speed error signal corresponding to a difference between said speed detection signal and a reference speed signal representing a predetermined reference speed:

integrator means for integrating said speed error signal;

wherein, to perform a track jumping operation, said fine adjustment means being forcibly driven by said speed error signal and said rough adjustment means being forcibly driven by an output of said integrator means so that said information detecting point is controlled to jump over a designated number of tracks at said reference speed.

4,930,115

METHOD OF AND DEVICE FOR RECORDING INFORMATION, RECORD CARRIER, AND DEVICE FOR READING THE RECORDED INFORMATION

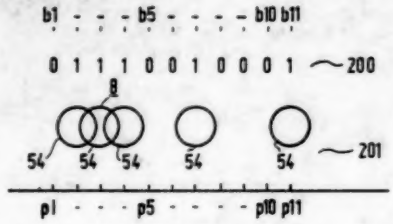
Johannes J. Verboom, Colorado Springs, Colo.; Constant P. M. J. Baggen, Baarlo, Netherlands; Cornelis M. J. Van Uijen, and Erik W. Gaal, both of Eindhoven, Netherlands, assignors to U.S. Philips Corp., New York, N.Y.

Filed May 5, 1988, Ser. No. 190,558

Claims priority, application Netherlands, Dec. 3, 1987, 8702903

Int. Cl.[5] H04N *5/76*; G11B *5/09*

U.S. Cl. 369—59 **15 Claims**



1. A method of recording an information signal on a record carrier, an information signal being converted into a code signal comprising code words made up of bits, the number of successive bits of a first logic value within the code word being at least equal to P, the number of successive bits of the second logic value within each code word, which are situated between the groups of at least P bits of the first logic value, being at least equal to Q, P being an integer greater than or equal to 1 and Q being an integer greater than P, in which method an information pattern of recording marks corresponding to the code signal is formed on the record carrier, in which pattern the bits of the first logic value are represented by the recording marks, characterized in that the number of bits of the first logic value is codeword dependent, information words of consecutive values being converted into code words whose logic value is different for only one bit.

4,930,116

RECORD CARRIER CONTAINING INFORMATION IN AN OPTICALLY READABLE INFORMATION STRUCTURE

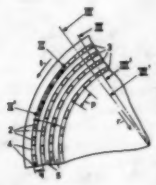
Jan G. Dil, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 26, 1979, Ser. No. 6,613

Claims priority, application Netherlands, Oct. 19, 1978, 7810463

Int. Cl.[5] G11B *7/00*

U.S. Cl. 369—275.1 **18 Claims**



1. A record carrier comprising an optically readable information structure having information areas arranged in tracks and spaced from each other in the track direction by intermediate areas, said tracks being spaced from each other by intermediate lands, said information areas having a configuration such that, upon illumination thereof by a beam of radiation with which said information structure is to be read, said information

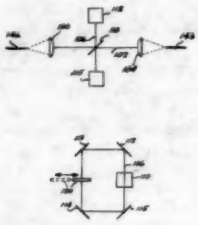
areas produce a substantially constant phase difference of approximately 180° between the zero order subbeam and the first order subbeam diffracted thereby and said intermediate areas differing optically from said lands and havig a configuration such that, upon illumination thereof by said radiation beam, said intermediate areas produce a substantially constant phase difference of between 95° and 145° between the zero and first order subbeams diffracted thereby.

4,930,117

WAVELENGTH DIVISION MULTIPLEXING SYSTEM USING OPTICAL SWITCH

Raymond W. Huggins, Mercer Island, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Jun. 24, 1988, Ser. No. 211,382
Int. Cl.[5] H04B *9/00*
U.S. Cl. 370—3 **9 Claims**



1. An optical wavelength division multiplexing system, comprising:

an optical bus;

an optical source for providing light having a plurality of wavelength bands and for coupling said light into the bus; and,

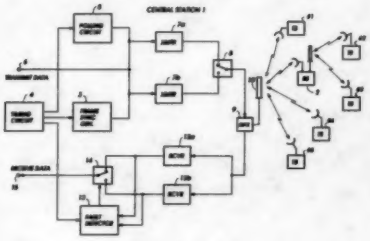
a plurality of optical switches serially coupled along the bus, each switch including means for reacting to an external stimulus by assuming one of at least two states, a first state being one in which light in all of said wavelength bands is substantially transmitted through the switch, a second state being one in which light in a modulation wavelength band is attenuated and light in the remaining wavelength bands is substantially transmitted through the switch, the modulation wavelength band being different for each switch, each switch comprising an optical stopband filter having a predetermined stopband and opposed first and second surfaces, means for coupling light from the optical bus onto the first surface of the stopband filter such that light within the stopband is substantially reflected by the stopband filter to produce a reflected beam, and light outside the stopband is substantially transmitted through the stopband filter to produce a transmitted beam, optical path means for causing the reflected beam to follow an optical path and to then strike the second surface of the stopband filter such that the reflected beam is rereflected by the stopband filter and combined with the transmitted beam to produce a recombined beam, the optical path means comprising first and second mirrors, and modulation means for selectively attenuating light traveling along said optical path in accordance with the external stimulus, to thereby selectively pass or attenuate light in said stopband.

4,930,118

FRAME-INTERVAL FAULT DETECTION IN A DEMAND ASSIGNMENT TDMA COMMUNICATION SYSTEM

Shigeru Sugihara, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Nov. 30, 1988, Ser. No. 277,734
Claims priority, application Japan, Nov. 30, 1987, 62-302574
Int. Cl.[5] H04J *3/02, 3/14*
U.S. Cl. 370—16 **8 Claims**



1. A demand assignment time division multiple access communication system having a central station and a plurality of terminal stations, said central station transmitting a frame sync and a polling signal at periodic intervals to said terminal stations to elicit a response thereform,

each of said terminal stations transmitting a test signal in response to reception of said frame sync from the central station, said central station comprising:

regular-channel receive means and spare-channel receive means for respectively establishing regular and spare channels to said terminal stations for receiving said test signal and an information signal as said elicited response;

fault detection means for detecting the strength of said test signals received by said regular-channel receive means and said spare-channel receive means and determining therefrom whether each of said regular-channel and spare-channel receive means is operating normally or abnormally; and

switch means for exclusively supplying said information signal received by said regular-channel receive means to utilization means when said regular-channel receive means is determined as operating normally, and exclusively supplying said information signal received by said spare-channel receive means to said utilization means when said regular-channel receive means is determined as operating abnormally while said spare-channel receive means is determined as operating normally.

4,930,119

DUPLEX SYSTEM OF TRANSMISSION LINES IN A LOOP NETWORK

Kenzo Kobayashi, Kawasaki; Yutaka Iwagaki, Yokosuka; Mitsuyo Hasegawa, Tokyo, and Kazushi Suganuma, Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

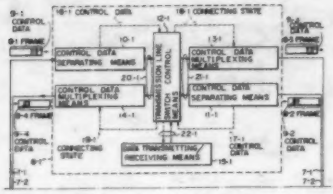
Filed Dec. 19, 1988, Ser. No. 286,614
Claims priority, application Japan, Dec. 19, 1987, 62-320134
Int. Cl.[5] H04J *3/14*
U.S. Cl. 370—16.1 **23 Claims**

1. A duplex system of a plurality of communication nodes connectable in a loop network, each of said communication nodes having data transmission/receive means, connected via duplex transmission lines, for transmitting data in two directions, each of said communication nodes comprising:

loop back means for effecting a loop back operation in response to a predetermined state of signals received from the two directions of the duplex transmission lines; and

return indication means for adding, to an output signal, a return indication that a received signal was returned when

the received signal could not be passed therethrough, each of said communication nodes autonomously beginning



and ending the loop back operation in response to the signals received from the two directions.

4,930,120

SIGNAL DISTRIBUTION NETWORK SYSTEM

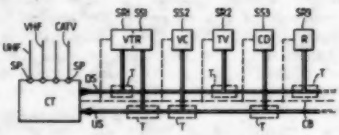
Thomas Baxter, Westerham, and Robert A. Barnes, Wallington, both of England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 18, 1989, Ser. No. 298,537

Claims priority, application United Kingdom, Jan. 22, 1988, 8801441

Int. Cl.[5] H04H *1/08*; H04J *1/02*

U.S. Cl. 370—73 **6 Claims**



1. A signal distribution cable network system in which frequency division multiplexing is employed to provide a plurality of information channels which are defined by respective carrier frequencies, said network system comprising a channel allocation controller which is operable on request to allocate temporarily an unused channel for the transport of information signals from a local signal source to a signal destination receiver connected to the network, the controller including means for transmitting tuning command signals to the local signal source and signal destination receiver to cause them to be tuned to the carrier frequency of the allocated channel, and said network system being characterised in that the local signal source includes a programmable modulator arrangement comprising a first input connected to receive tuning command signals from the controller, a second input connected to receive baseband video/audio signals generated by the local signal source, a frequency generator which is responsive to a tuning command signal pertaining to a selected channel carrier frequency to produce a carrier signal of that frequency, and a modulator connected to receive said carrier signal and said baseband video/audio signals and responsive to produce a modulated carrier signal for transport over the selected channel.

4,930,121

NETWORK SYSTEM USING TOKEN-PASSING BUS WITH MULTIPLE PRIORITY LEVELS

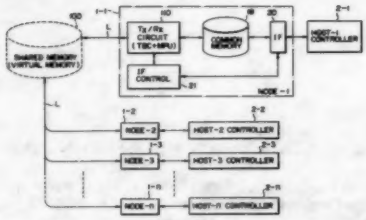
Yashuhisa Shiobara, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 9, 1988, Ser. No. 242,262

Claims priority, application Japan, Sep. 9, 1987, 62-225516

Int. Cl.[5] H04J *3/02*

U.S. Cl. 370—85.4 **27 Claims**



1. A network system using a token passing bus access-method, comprising:

a bus type transmission path;

a plurality of nodes, coupled to said transmission path, for executing a priority processing algorithm based on a standard of an IEEE 802.4 token-passing bus or a standard of a bus functionally substantially equivalent to said token-passing bus;

a plurality of common memories respectively included in said plurality of nodes and each of said common memories having a mutually common address structure, said common memories being connected together to function as a shared virtual memory; and

a plurality of communication means, respectively included in said plurality of nodes, for communicating storage contents of said common memories of said plurality of nodes between said common memories through said transmission path in accordance with priority levels of said priority processing algorithm.

4,930,122

MESSAGE TRANSFER SYSTEM AND METHOD

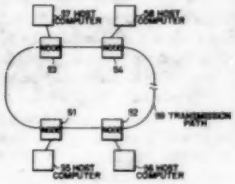
Yasuhiro Takahashi, Fujisawa, and Osamu Takada, Ebina, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 29, 1988, Ser. No. 150,171

Claims priority, application Japan, Mar. 9, 1987, 62-53808

Int. Cl.[5] H04J *3/00*

U.S. Cl. 370—85.15 **8 Claims**



1. A message transfer system wherein messages are transferred between at least two nodes on a transmission loop by segmenting each of the messages into a plurality of packets, said system comprising:

storage means for registering a code that identifies the sender address from which messages are to be received;

message buffer means for receiving and reassembling the message from the received packets;

means for controlling the arrival of said packets at said message buffer means, in accordance with whether or not said packets correspond to the registered code which identifies the sender address.

4,930,123
METHOD FOR CONTROLLING ADDRESS PARAMETERS FOR INTERCONNECTING LAW AND ISDN

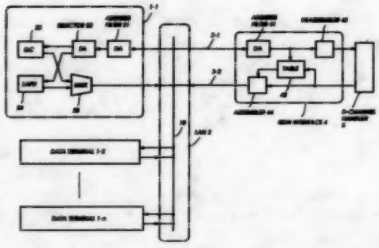
Hiroshi Shimizu, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Mar. 6, 1989, Ser. No. 319,250

Claims priority, application Japan, Mar. 4, 1988, 63-52155; Mar. 4, 1988, 63-52156

Int. Cl.[5] H04J *3/26*

U.S. Cl. 370—94.1 **12 Claims**



1. A method for interconnecting a plurality of data terminals of a local area network and an integrated services digital network (ISDN), said ISDN being capable of assigning Terminal Endpoint Identifier (TEI) values respectively to data terminals which are accessible through a common interface unit to said network, each of said data terminals being assigned an address value and capable of transmitting a terminal-to-network LAPD (Link Access Protocol on the D-channel) packet to said interface unit, said interface unit being assigned an address value, the method comprising:

transmitting from said interface unit to said data terminals a network-to-terminal LAPD packet containing a TEI value of group address, an action indicator set to an assigned TEI value and a destination address value of a group address of said data terminals; and

transmitting from the data terminal specified by the assigned TEI value a said terminal-to-network LAPD packet containing the address value of said interface unit as a destination address and said assigned TEI value contained in said network-to-terminal LAPD packet.

4,930,124
DECENTRALIZED AND SYNCHRONOUS DATA TRANSMISSION PROCESS AND NETWORK

Bertrand de Boisseron, Paris; Michel Salvan, Epinay S/Orge, and Michèle Gugenhein, Paris, all of France, assignors to Thomson-CSF, Puteaux, France

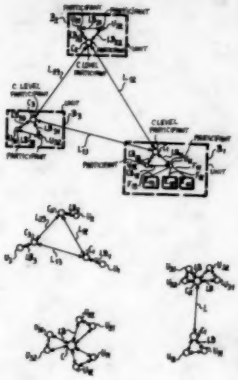
Filed Sep. 21, 1987, Ser. No. 86,082

Claims priority, application PCT Int'l Appl., Nov. 21, 1985, PCT/FR85/00327

Int. Cl.[5] H04J *3/24, 3/06*

U.S. Cl. 370—94.3 **7 Claims**

1. A method of data transmission between a plurality of stations, called participants, capable of transmitting and/or receiving data, wherein the data is transmitted by the participants by way of time multiplexing, each of the participants having a predefined transmission time within a period of time called a cycle wherein said cycle is divided into sequences and, for each sequence a single predefined participant may transmit data which is designated to one or more predefined participants; said method comprises at least one step for the initial synchronization of all of the participants with each other and, prior to any transmission of data other than synchronization data, the method further comprises a routing step, determining the participant receiving data information to be transmitted



wherein said data information is a function of the final destination of said data information and of the quality of the communication links between participants wherein said quality is based upon prior error counts of said connections.

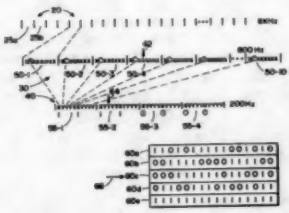
4,930,125
MULTIPLEXER FRAME SYNCHRONIZATION TECHNIQUE

Kuldip S. Bains, Watertown, Conn., assignor to General Data-Com, Inc., Middlebury, Conn.

Filed Jan. 30, 1989, Ser. No. 304,015

Int. Cl.[5] H04J *3/06*

U.S. Cl. 370—105 **16 Claims**



1. A method for determining loss of synchronization of a composite subaggregate frame comprised of a primary and secondary frame and contained within an independently synchronized aggregate, said method comprising:

(a) locating a plurality of synch bits in said secondary frame such that said synch bits are evenly spaced in the primary frame and such that when said composite subaggregate frame is synchronized said synch bits are chosen to be inserted into the same predetermined position in said independently synchronized aggregate;

(b) providing values for the synch bits in the secondary frame such that a collection of said synch bits of a composite frame provides an internally non-repeating pattern;

(c) collecting bits located in said predetermined location of the independently synchronized aggregate at predetermined intervals; and

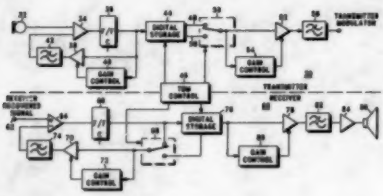
(d) determining whether the values of the collected bits correspond to the bit values of said non-repeating pattern.

4,930,126

TIME DIVISION MULTIPLEX SYSTEM SUITED FOR BURST ANALOG TRANSMISSION

Henry L. Kazecki, Arlington Heights, and James C. Baker, Hanover Park, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 5, 1989, Ser. No. 362,634
Int. Cl.[5] H04J 3/00
U.S. Cl. 370—109 17 Claims



1. A time division multiplexed (TDM) transmitter in which an input signal is compressed in time before transmission to form a compressed signal, at least first and second time slots exist in each TDM frame with the transmitter transmitting said compressed signal during said first slot, the transmitter comprising:

means for storing digital data correspoding to said input signal;

means for converting said digital data into an analog signal used to modulate said transmitter;

first means for transferring said digital data stored during one frame to said conver216

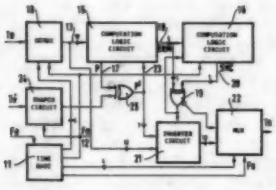
second means for transferring said digital data stored during one frame to said converting means during the slot preceding said first slot during the next frame to maintain magnitude continuity from the end of the first slot in the first frame to the beginning of the first slot in the next frame thereby minimizing undesired due to magnitude discontinuities.

4,930,127

METHOD AND DEVICE FOR TRANSMITTING A DIGITAL ENGINEERING SERVICE CHANNEL BY MEANS OF THE PARITY CHANNEL OF A DIGITAL BIT STREAM TRANSMITTED IN A CODE WITH PARITY CHECKING

Jean-Luc Abaziou, Pleumeur Bodou; Jean-Claude Billy, and Bernard Le Mouel, both of Saint Quay Perros, all of France, assignors to Societe Anonyme dite : Alcatel CIT, Paris, France

Filed Dec. 15, 1988, Ser. No. 284,579
Claims priority, application France, Dec. 17, 1987, 87 17644
Int. Cl.[5] H04L 25/48
U.S. Cl. 370—110.4 6 Claims



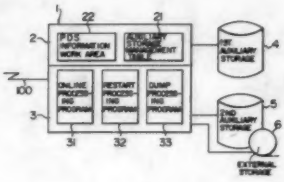
1. Method of transmitting a digital service channel by means of the parity channel of a digital bit stream transmitted in a code with parity checking with parity words inserted at specific times by modifying spaced groups of even numbers of consecutive parity words to violate the parity law of the parity checking code.

4,930,128

METHOD FOR RESTART OF ONLINE COMPUTER SYSTEM AND APPARATUS FOR CARRYING OUT THE SAME

Shuuji Suzuki, Yokohama; Kenzo Moriyama, Fujisawa, and Yuuji Sueoka, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 24, 1988, Ser. No. 211,045
Claims priority, application Japan, Jun. 26, 1987, 62-159347
Int. Cl.[5] G06F 11/20
U.S. Cl. 371—12 5 Claims



1. A method for restarting, after a system goes down due to occurrence of a fault, an online processing system based on a computer which employs a virtual storage system comprised of a main storage, a first auxiliary storage and a second auxiliary storage, said method comprising the steps of:

effecting initialization of an online processing program;

storing data within said main storage of said virtual storage system into a first area of said second auxiliary storage immediately after the initialization of the online processing program;

registering information indicative of occupied/unoccupied status of individual data storage units in said first auxiliary storage into a first auxiliary storage management table of said main storage;

storing data present in said main storage at the time of occurrence of a fault and a consequent system down condition into a second area of said second auxiliary storage;

storing management information present in said first auxiliary storage management table at the time of the occurrence of the fault into a third area of said second auxiliary storage;

reloading the data, which is present in said main storage immediately after the initialization and which has been stored in said first area of said second auxiliary storage, into said main storage;

registering the management information, which has occurred at the time of the occurrence of the fault and then stored in said third area of said second auxiliary storage, into a second auxiliary storage management table of said main storage; and

restarting the online processing program and utilizing said virtual storage system by accessing said first and second auxiliary storage management tables.

4,930,129

IC CARD HAVING INTERNAL ERROR CHECKING CAPABILITY

Kenichi Takahira, Hyogo Prefecture, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

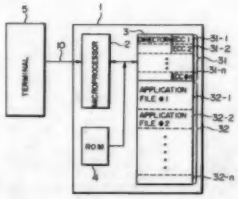
Filed Mar. 11, 1988, Ser. No. 166,624
Claims priority, application Japan, Mar. 13, 1987, 62-59808
Int. Cl.[5] G06F 11/10
U.S. Cl. 371—40.4 9 Claims

1. An IC card adapted to interface with at least one terminal

for performing a plurality of applications, the IC card comprising in combination:

onboard memory means divided into a plurality of application blocks for storage of information related to the applications, some of the application blocks being of a size different from others, the memory means also having a protected block for storage of application block information including directory data and an error check code relating to each of the plurality of application blocks;

an onboard microprocessor for controlling access to the memory in such a way as to prevent access to the protected block by the terminal and to selectively allow



access to the application blocks by the terminal for selectively performing the applications; and

program means for causing the microprocessor

(a) to compute an error check code for a data group related to one of the plurality of applications, and to store the data group in a selected application block and the computed error check code in the protected block in the location associated with the selected application block when the data group is sent from the terminal,

(b) to detect data error in the stored data group in an application block accessed from the terminal by using the data group and the error check code thereof when the data block is read out to the terminal.

4,930,130

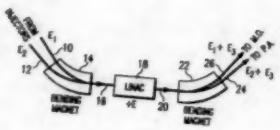
BIMODAL LINEAR ACCELERATOR APPARATUS

Robert J. Burke, 1991 Rayshire St., Thousand Oaks, Calif. 91362

Filed Nov. 29, 1988, Ser. No. 277,158

Int. Cl.[5] H01S *3/00*

U.S. Cl. 372—2 **7 Claims**



1. A Multipurpose free electron laser apparatus comprising, in combination:

an electron injector first means for providing a first stream of. electrons at a first energy level;

an electron injector second means for providing a second stream of electrons at a second energy level which second level is higher than said first energy level;

a linear accelerator third means, including input means and output means, for increasing the energy of any electrons passing therethrough between said input means and said output means;

a bending magnet fourth means, including input means and output means, positioned and aligned between said first and second means and said third means said first stream of electrons is deflected more than said second stream of electrons and further whereby the two beams follow a common path upon exiting said fourth means at said output means thereof on the way to said third means;

a load fifth means for receiving said first stream of electrons;

a load sixth means for receiving said second stream of electrons; and

a bending magnet seventh means, including input means and output means, positioned and aligned between said third means and said fifth and sixth means in a manner whereby said first stream of electrons is deflected more than said second stream of electrons and further whereby the two beams follow a common path into said seventh means while exiting in separate paths toward said fifth and sixth means in accordance with their respective beam energy levels.

4,930,131

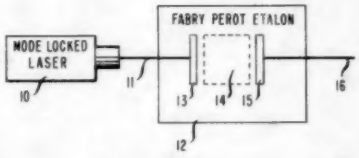
SOURCE OF HIGH REPETITION RATE, HIGH POWER OPTICAL PULSES

Theodore Sizer, II, Little Silver, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jan. 6, 1989, Ser. No. 294,034

Int. Cl.[5] H01S *3/098*

U.S. Cl. 372—18 **18 Claims**



1. An optical device for generating a stream of optical pulses comprising:

a source of modelocked optical pulses occurring at a first repetition rate, and

means coupled optically to said source for selecting at least two predetermined spectral modes output from said source to generate a stream of optical pulses at a second repetition rate, said second repetition rate being higher than the first repetition rate.

4,930,132

SECOND HARMONIC WAVE GENERATING DEVICE HAVING ACTIVE LAYER AND SECOND HARMONIC WAVE GENERATING LAYER ON SAME SUBSTRATE

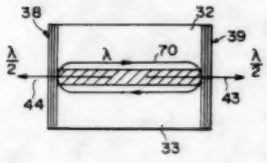
Akira Shimizu, Inagi, and Sotomitsu Ikeda, Atsugi, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 22, 1988, Ser. No. 288,457

Claims priority, application Japan, Dec. 28, 1987, 62-334972; Jun. 14, 1988, 63-144867

Int. Cl.[5] H01S *3/10*

U.S. Cl. 372—22 **21 Claims**



1. A second harmonic wave generating device comprising:

a substrate;

an active layer on said substrate for generating light of a wavelength λ in response to injection of a current;

a layer of a material on said substrate for generating light of a wavelength λ/2 from the light generated in said active layer; and

a pair of electrodes for supplying said active layer with a current.

4,930,133

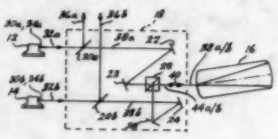
MULTIPLE LASER FREQUENCY STABILIZATION

William R. Babbitt, Bellevue; Raymond G. Beausoleil, Redmond, and David A. Leep, Seattle, all of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Jun. 5, 1989, Ser. No. 361,148

Int. Cl.[5] H01S 3/13

U.S. Cl. 372—32 **12 Claims**



1. A system for producing first and second laser beams having a stable frequency difference therebetween, the system comprising:

a first laser including a first optical input port, a first optical output port and means for producing the first laser beam at the first optical output port;

a second laser including a second optical input port, a second optical output port, and means for producing the second laser beam at the second optical output port;

an optical resonator; and,

coupling means including means for coupling portions of the first and second laser beams into the resonator such that the resonator produces first and second optical feedback beams, respectively, means for coupling the first optical feedback beam into the first input port, and means for coupling the second optical feedback into the second input port;

whereby the optical resonator provides optical feedback to each laser such that each laser locks to a resonant mode of the optical resonator.

4,930,134

PRECISION TEMPERATURE SENSOR

Anthony F. Macaione, Missouri City, and John V. Wright, Stafford, both of Tex., assignors to Reiton Corporation, Houston, Tex.

Filed Jun. 5, 1989, Ser. No. 361,364

Int. Cl.[5] H01S 3/00, 3/13

U.S. Cl. 372—33 **15 Claims**

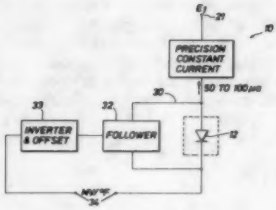
1. A laser control system comprising:

(a) a laser emitting a light beam therefrom capable of illumination;

(b) a photodiode exposed to the laser in near proximity thereto for receiving illumination thereof;

(c) an optical feedback control means connected to said photodiode for providing a control signal for a laser power supply wherein the laser power supply provides controlled power for operation of said laser; and

(d) means for selectively switching the photodiode into connection with said control means for operation of said laser subject to control as measured by said photodiode,



and wherein said photodiode and said laser are supported for exposure to a common temperature.

4,930,135

LASER OSCILLATOR DEVICE

Norio Karube, Machida; Akira Egawa, Minamitsuru; Etsuo Yamazaki, Hachioji; Nobuaki Ichisa, Minamitsuru, and Mitsuo Manabe, Hachioji, all of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

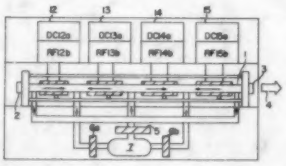
PCT No. PCT/JP88/00426, § 371 Date Dec. 5, 1988, § 102(e) Date Dec. 5, 1988, PCT Pub. No. WO88/09630, PCT Pub. Date Nov. 3, 1988

PCT Filed Apr. 28, 1988, Ser. No. 283,479

Claims priority, application Japan, Apr. 30, 1987, 62-107827

Int. Cl.[5] H01S 3/00

U.S. Cl. 372—33 **9 Claims**



1. A laser oscillator device for applying a high-frequency voltage to a plurality of discharge regions through a dielectric to produce a high-frequency discharge for laser pumping, comprising:

DC power supply means for providing a DC voltage; and

high-frequency power supply means for converting the DC voltage into a high-frequency voltage, the DC power supply coupled to each other to prevent electromagnetic and other interferences, thereby stabilizing said laser oscillator.

4,930,136

SEGMENTED AIR COOLED LASER TUBE

Edwin G. Chaffee, Salt Lake City, Utah, assignor to American Laser Corporation, Salt Lake City, Utah

Filed Mar. 7, 1989, Ser. No. 319,661

Int. Cl.[5] H01S 3/03

U.S. Cl. 372—62 **6 Claims**

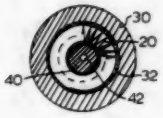
1. A laser tube comprising:

(a) a plurality of axially-aligned, elongated, thin wall cylindrical segments of electrically-insulating material successively disposed between electrodes at anode and cathode ends in hermetically bonded relationship with one another and forming an outer wall of the laser tube, each said cylindrical segment defining within the wall thereof a longitudinal extending central cavity;

(b) a plurality of axially-extending and axially-spaced heat

dissipating fin structures supported within and secured to the internal wall of each segment, each fin structure having a central cavity aligned with the central cavity of other fin structures within the same segment;

(c) a ferrule within each fin structure cavity providing a plurality of axially-spaced ferrules in each segment having an overall length less than the length of the segment in



which such plurality of ferrules are installed, said segments each containing plural said ferrules establishing a gas discharge bore;

(d) metallic securing means disposed between and bonded to the facing end surfaces of adjacent ones of said cylindrical segments; and

(e) means operatively associated with said fin structures and ferrules establishing a gas return path.

4,930,137

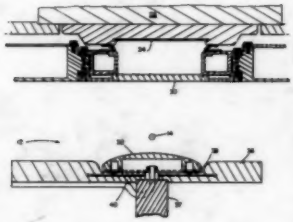
INORGANIC TRIPLE POINT SCREEN

Edward G. Sergoyan, 18716 198th Ave., NE., Woodinville, Wash. 98072, and Michael von Dadelszen, 11811 103rd Ave., NE., Kirkland, Wash. 98034

Filed Nov. 8, 1988, Ser. No. 268,736

Int. Cl.[5] H01S *3/097*

U.S. Cl. 372—81 **10 Claims**



1. An insulator assembly for use with an electrode of an electrical discharge device containing a discharge gas, the electrode being held at a predetermined electrical potential with respect to a ground potential and generating an electric field adjacent the electrode, the insulator assembly comprising:

a block of an inorganic dielectric material, the block being contoured to receive the electrode and thereby defining a triple point where the dielectric material, the electrode, and the discharge gas meet, and

a conductive screen positioned to a side of the block of inorganic dielectric material away from the electrode, the screen being connectable to the predetermined electrical potential and extending in close proximity to the triple point, whereby the electric field intensity at the triple point is reduced.

4,930,138

WAVEGUIDE LASER SYSTEM

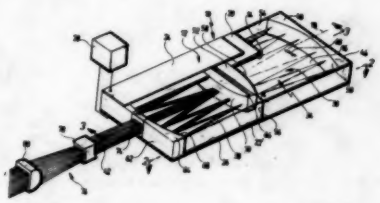
Hans Opower, Krailling, Fed. Rep. of Germany, assignor to Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Bonn, Fed. Rep. of Germany

Filed Aug. 24, 1989, Ser. No. 399,030

Claims priority, application Fed. Rep. of Germany, Aug. 26, 1988, 3828952

Int. Cl.[5] H01S *3/08*

U.S. Cl. 372—95 **34 Claims**



1. An electrically excited, diffusion-cooled laser system comprising two wall surfaces slightly spaced from one another and forming an optical waveguide, the width of said wall surfaces being a multiple of the space between them and said surfaces enclosing between them a flow-free discharge chamber, and also comprising an optically unstable resonator having a resonator axis extending approximately parallel to said wall surfaces and having a resonator beam path travelling through at least part of said discharge chamber, said beam path extending generally along and transversely away from said resonator axis to a point at which said beam path exits from said resonator into a laser amplifier having an amplifier beam path that travels through an additional part of said discharge chamber whereby a surface area of said waveguide can be maximized without degrading beam quality.

4,930,139

SPREAD SPECTRUM COMMUNICATION SYSTEM

Donald G. Chandler, Princeton; Steve J. Nossen, Somerset, and Raymond W. Simpson, Hamilton Square, all of N.J., assignors to O'Neill Communications, Inc., Princeton, N.J.

Filed May 31, 1989, Ser. No. 359,206

Int. Cl.[5] H04K *1/00*

U.S. Cl. 375—1 **19 Claims**

1. A digital communication system comprising:

input means for inputting a digital information signal, at a data rate, to be transmitted;

a chip stream generator means connected to said input means for converting said information signal into a chip stream having a chip rate greater than said data rate;

scrambler means for scrambling said chip stream to produce a scrambled chip stream signal; and

output means connected to said scrambler means for transmitting said scrambled chip stream signal as a radio signal.

4,930,140
CODE DIVISION MULTIPLEX SYSTEM USING SELECTABLE LENGTH SPREADING CODE SEQUENCES

Peter K. Cripps, New Hope, and Michael A. Plotnick, Southampton, both of Pa., assignors to Agilis Corporation, Mountain View, Calif.

Filed Jan. 13, 1989, Ser. No. 297,412
Int. Cl.[5] H04K *1/00*
U.S. Cl. 375—1 **15 Claims**

1. A method of communicating an input data signal between a transmitter and a receiver in a spread spectrum code division multiplex system, said method comprising the steps of:

selecting a transmitter spread spectrum spreading code sequence of a given length at said transmitter;

generating said transmitter spread spectrum spreading code sequence of said selected given length;

selecting a transmitter time delay substantially equal to the length of said selected transmitter spread spectrum spreading code sequence;

differentially encoding said spread spectrum spreading code sequence in accordance with said input data signal using said selected transmitter time delay; transmitting said differentially encoded spread spectrum spreading code sequence as a spread spectrum signal; and at said receiver;

receiving said differentially encoded spread spectrum spreading code sequence;

selecting a receiver time delay corresponding to a given length of a receiver spread spectrum spreading code sequence said receiver time delay having a length substantially equal to the length of said selected transmitter time delay;

differentially correlating said received spread spectrum signal with said selected given length of said receiver spread spectrum spreading code sequence using said selected receiver time delay substantially equal to the length of said selected receiver spread spectrum spreading code sequence to recover said input data signal.

4,930,141
MULTI-PHASE PSK MODULATION APPARATUS

Shinichi Ohmagari, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jul. 29, 1988, Ser. No. 226,012
Claims priority, application Japan, Jul. 31, 1987, 62-190127
Int. Cl.[5] H04L *25/49*
U.S. Cl. 375—60 **1 Claim**

1. A four-phase PSK modulation apparatus comprising:

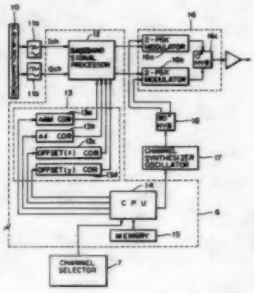
(a) a four-phase PSK modulator comprising two sets of two-phase PSK modulators and a combiner to in-phase synthesize outputs thereof, for four-phase PSK modulating two carrier waves input to the two-phase PSK modulators by baseband signals respectively input to the two-phase PSK modulators, said two carrier waves having the same frequency but being different from each other in phases for 90°;

(b) a channel synthesizer for generating a carrier wave of a variable frequency;

(c) a 90° hybrid for receiving the carrier wave generated by the channel synthesizer, generating the two carrier waves, and transmitting them to the four-phase PSK modulator;

(d) a memory for storing modification data corresponding to various frequencies of the carrier waves;

(e) a central processing unit for receiving a frequency selection signal from a channel selector and controlling the variable frequency of the carrier wave to be generated by the channel synthesizer to the selected frequency and reading out from the memory the modification data corresponding to the selected frequency;



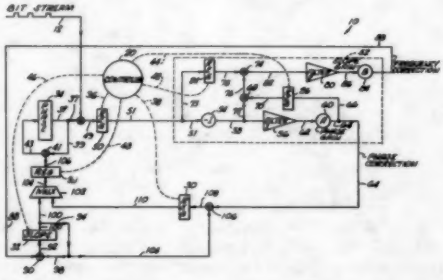
(f) a corrective network for controlling amounts of modification to be added to the baseband signal with respect to an offset error, an amplitude error and an orthogonality error in outputs of the four-phase PSK modulator, in response to the modification data read out by the central processing unit; and

(g) a baseband signal process for adding to the baseband signals the modifications in the amounts controlled by the corrective network and transmitting the modified baseband signals to the four-phase PSK modulator.

4,930,142
DIGITAL PHASE LOCK LOOP

Douglas L. Whiting, South Pasadena, and Glen A. George, Pasadena, both of Calif., assignors to STAC, Inc., Pasadena, Calif.

Filed Dec. 6, 1988, Ser. No. 281,305
Int. Cl.[5] H03D *3/20*
U.S. Cl. 375—120 **14 Claims**



1. A method for generating a digital clock signal which is frequency and phase referenced to an external digital data signal, the phase of said digital data signal initialized to a phase lock point arbitrarily determined, the slope of said digital clock signal initialized to a desired initial slope value, said external digital data signal subject ot variations in data frequency and high frequency jitter unrelated to changes in said data frequency, said method comprising the steps of:

for each clock cycle of said digital clock signal;

adding the value of slope of the clock signal to the value of phase of the digital data signal to obtain an uncompensated value of phase, generating a clock pulse when said

uncompensated value of phase is greater than or equal to a predetermined value, and reinitializing the value of phase by subtracting said predetermined value from said value of phase, minitoring said external digital data signal for a pulse of said external digital data;

operative when said pulse of external digital data is detected, subtracting said phase lock point from the value of phase to determine phase error, filtering said phase error to generate a phase correction value, adding said phase correction value to said uncompensated phase value to obtain a compensated phase value, determining the difference between the phase error for the current clock cycle and the previous clock cycle to obtain an uncompensated value of slope error, filtering said slope error to generate a slope correction value, adding the slope correction value to the slope to obtain a compensated slope value, and adding the compensated slope value to the compensated phase value to obtain a new phase value, said new phase value being the starting phase value of the next clock cycle, whereby the phase and/or slope are compensated in order to generate a digital clock signal which closely references said external digital data signal.

4,930,143

METHOD AND DEVICE FOR MAMMOGRAPHIC STEREOTACTIC PUNCTION OF PATHOLOGICAL LESIONS IN THE FEMALE BREAST

Bengt Lundgren, Norra Ringvägen 23, S-803 57 Gävle, and Anders Wallner, Skvattramsvägen 17, S-803 62 Gävle, both of Sweden

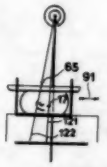
PCT No. PCT/SE87/00423, § 371 Date Jul. 13, 1988, § 102(e) Date Jul. 13, 1988, PCT Pub. No. WO88/01847, PCT Pub. Date Mar. 24, 1988

PCT Filed Sep. 21, 1987, Ser. No. 199,033

Claims priority, application Sweden, Sep. 19, 1986, 8603965

Int. Cl.[5] A61B *6/04*

U.S. Cl. 378—37 **4 Claims**



1. A mammographic unit for use in stereographic localisation in a breast of a lesion suspected of being cancerous, said unit comprising:

a stand;

an x-ray tube mounted on the stand so as to emit an x-ray beam in a defined field;

a holder means, laterally slidable with respect to said beam between a first imaging position within said field and a second imaging position within said field, for receiving a breast and for restraining the breast in a fixed shape, the fixed shape being maintained when the holder means is displaced between said first and second positions; and

means for holding a film, located within the x-ray field and held stationary relative to the x-ray tube, in a position such that a first picture of said breast taken at the first imaging position and a second picture of the breast taken at the second imaging position will be located side by side on the film.

4,930,144

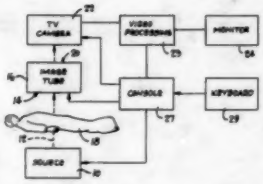
RADIATION IMAGING MONITOR CONTROL IMPROVEMENT

Leonard F. Plut, Willowick, and David Nicolay, Fairview Park, both of Ohio, assignors to Picker International, Inc., Cleveland, Ohio

Continuation of Ser. No. 936,470, Nov. 25, 1986. This application May 25, 1988, Ser. No. 203,510

Int. Cl.[5] H05G *1/64*

U.S. Cl. 378—99 **7 Claims**



1. A radiation imaging system comprising:

(a) a source of penetrative radiation;

(b) acquisition means for detecting patterns of radiation from said source and for producing a video output representing said patterns in accordance with one of a set of selectable acquisition modes;

(c) control means for operating said acquisition means in accordance with a selected one among said set of operating modes;

(d) a monitor including input circuitry coupled to receive said video output and means including a cathode ray tube and an electron gun to produce in raster format a visual image corresponding to said radiation patterns represented by said video output, and means for adjusting the aspect ratio of said visual image;

(e) circuit means automatically operable on said monitor for adjusting the aspect ratio of said image acceptable by said monitor as a function of the format of said operating mode which is selected by said control means, and

(f) circuit means for adjusting the brightness of said image as a function of the aspect ratio of said image produced by said monitor.

4,930,145

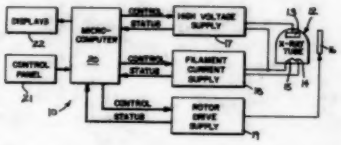
X-RAY EXPOSURE REGULATOR

Karl F. Sherwin, and Manfred D. Boehm, both of Waukesha, Wis., assignors to General Electric Company, Milwaukee, Wis.

Filed Aug. 15, 1988, Ser. No. 232,498

Int. Cl.[5] H05G *1/32*

U.S. Cl. 378—109 **13 Claims**



1. In an X-ray imaging apparatus having an X-ray tube, a source of an excitation voltage for the tube, and a source of filament current for the tube, the improvement being a filament current regulating circuit comprising:

a first means for comparing the filament current to a predefined reference current value;

a second means for comparing the excitation voltage to a predefined reference voltage value; and

means for regulating the filament current applied to the tube,

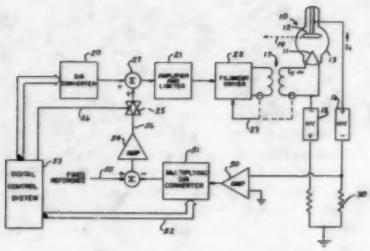
said means for regulating being responsive to only the first means for comparing during a first period of time from the start of an X-ray exposure, and after the first period of time being responsive to the second means for comparing.

4,930,146

X-RAY TUBE CURRENT CONTROL WITH CONSTANT LOOP GAIN

Gerald K. Flakas, Oconomowoc, and Harold J. Dalman, Brookfield, both of Wis., assignors to General Electric Company, Milwaukee, Wis.

Filed Jul. 10, 1989, Ser. No. 377,353
Int. Cl.[5] H05G *1/34*
U.S. Cl. 378—110 **3 Claims**



1. In a current control system for an x-ray tube having a filament driver which supplies current to the x-ray tube filament in response to a preheat command signal, the improvement comprising:

means for producing a tube current feedback signal which indicates the amount of current flowing between the filament and the anode of the x-ray tube;

means for producing a command signal which is proportional to the reciprocal of a tube current command;

multiplying means for multiplying the tube current feedback signal by the command signal to produce a tube current error signal;

subtraction means for subtracting the tube current error signal from a reference signal to produce a corrected tube current error signal;

summing means for combining the preheat command signal with the corrected tube current error signal to produce a filament command signal to control the tube filament temperature and cause the tube current to attain a value indicated by the tube current command; and

means for supplying said filament command signal to said filament drive.

4,930,147

CASSETTE FILM TRANSPORT

Paul E. Dieterlen, Kenton, Ky., and Lewis B. Mustain, Cincinnati, Ohio, assignors to Liebel-Flarsheim Company, Cincinnati, Ohio

Division of Ser. No. 45,877, May 1, 1987, Pat. No. 4,845,733.
This application Apr. 13, 1989, Ser. No. 337,647
Int. Cl.[5] G03B *42/02*
U.S. Cl. 378—176 **9 Claims**

1. An x-ray film apparatus comprising:

a housing;

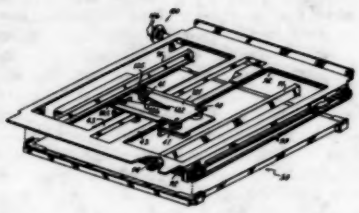
movable carriage means within said housing and movable relative said housing along a first path for moving an x-ray film cassette between a loading station and an x-ray station;

first drive means coupled to said carriage means for driving said carriage means between said stations;

cassette loading means attached to said movable carriage means for moving the cassette along a second path into and out of said carriage meas;

second drive means at said loading station for driving said cassette loading means whereby to move the cassette; and

interconnect means for selectively, physically connecting and disconnecting said second drive means to and from



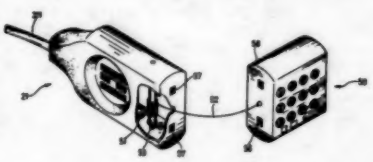
said cassette loading means, said second drive means being physically connected to said cassette loading means when said carriage means is at said loading station, said second drive means being physically disconnected from said cassette loading means when said carriage means is spaced away from said loading station.

4,930,148

HEADBAND RADIOPHONE COMBINATION SET

Hsiao-Chung Lee, 3F1., No. 77-8, Jenn Chien Street, Shu Lin Town, Taipei Hsien, Taiwan

Filed Oct. 23, 1989, Ser. No. 425,672
Int. Cl.[5] H01Q *7/04*
U.S. Cl. 379—58 **7 Claims**



1. A headband radiophone combination set, including comprising:

a headband radiophone including a circular supporting band having mounted thereon a charging board, a miniature antenna and a ringer and having connected thereto a first and a second adjusting bar respectively at both ends a main earphone having set therein a control circuit, a receiver-transmitter circuit, and a volume control knob, and being pivotably connected with a mouthpiece link at one end and fixedly connected with said first adjusting bar at the other end, an auxiliary earphone connected to said second adjusting bar by means of a connection, a mouthpiece fixedly connected to said mouthpiece link, and a keyboard movably connected to said mouthpiece; and

a main switching unit, comprising an input key portion for signal input, a receiver and a mouthpiece and a hand set for communication, a volume control knob for volume control, a receiver-transmitter circuit and an antenna for transmitting signal input through said input key portion to said headband radiophone;

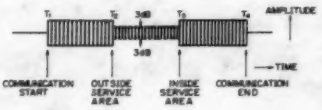
characterized in that said headband radiophone uses its control circuit, receiver-transmitter circuit and miniature antenna to reciprocally communicate with the antenna and the receiver-transmitter circuit of said main switching unit for internal, external or regular alternative telecommunication.

4,930,149

CORDLESS TELEPHONE COMMUNICATION SYSTEM

Kouji Matsushima, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Sep. 13, 1989, Ser. No. 406,564
Claims priority, application Japan, Sep. 13, 1988, 63-229264
Int. Cl.[5] H04B 7/26
U.S. Cl. 379—61 9 Claims



1. A cordless telephone communication system wherein provision is made of a base unit and a handset unit connected to said base unit through a radio transmission channel and communication is performed between a remote telephone set and said handset unit through a public telephone line connected to said base unit, wherein provision is made in the said base unit of:

a detection means which detects if the handset unit is out of a service area by signals received from said handset unit and

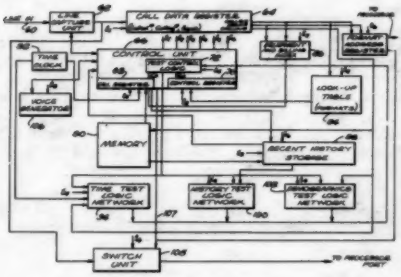
a semi-mute means for reducing the level of said received signals to lower than the level of said received signals in the case where the handset unit is within the service area by detection output from said detection means.

4,930,150

TELEPHONIC INTERFACE CONTROL SYSTEM

Ronald A. Katz, Los Angeles, Calif., assignor to First Data Resources Inc., Omaha, Nebr.

Continuation-in-part of Ser. No. 18,244, Feb. 24, 1987, Pat. No. 4,792,968, which is a continuation-in-part of Ser. No. 753,299, Jul. 10, 1985, abandoned. This application Oct. 20, 1988, Ser. No. 260,104
The portion of the term of this patent subsequent to Dec. 20, 2005, has been disclaimed.
Int. Cl.[5] H04M 11/06
U.S. Cl. 379—93 19 Claims



1. An interface control system for use with, (1) a communication facility including remote terminals for individual callers, wherein said remote terminals may comprise a conventional telephone instrument including voice communication means and digital input means for providing data, and (2) a multiple port, multiple format processor for concurrently processing data from a substantial number of callers in any of a plurality of format, said interface control system comprising:

call data means for receiving calls from said remote terminals in association with ports of said multiple port, multiple format processor, said calls providing signalrepresented call data to said call data means;

selection means for selecting one format of said plurality of formats of said multiple port, multiple format processor, said selection means being controlled by said signal-represented call data from a calling remote terminal to thereby specify defined conditions for a connection to said multiple port, multiple format processor, at least one of said formats having at least one specified condition;

test means for testing the specified defined conditions for a calling remote terminal to provide approval signals; and

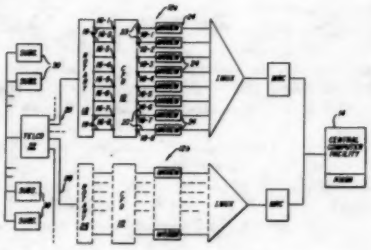
interconnect switch means for providing connections from the ports of said multiple port, multiple format processor to a calling remote terminal under control of said approval signal from said test means.

4,930,151

TELEPHONE CALL FORWARDING DEVICE

Paul B. Walton, Silver Spring; James Keough, Rockville, both of Md.; Richard L. Demers, Dale City, Va.; Leland A. Denny, Jr., Frederick, Md.; Robert E. Kaiser, Rockville, Md.; Cornelius Moses, Jr., Silver Spring, Md., and Vijay N. Wagh, Derwood, Md., assignors to General Electric Company, N.Y.

Filed May 16, 1989, Ser. No. 352,515
Int. Cl.[5] H04M 11/06, 3/54
U.S. Cl. 379—94 36 Claims



1. A call forwarding device for installation between a telephone rotary switch having a plurality of outlet ports and an array of separate modems of a facility answering site, said call forwarding device including, in combination:

A. a channel bus including a plurality of alternate telecommunications channels,

B. a plurality of channel switches, each said channel switch having

(1) a rotary port connected with a different one of the rotary switch outlet ports,

(2) a modem port connected with a different modem of the modem array,

(3) an internal telecommunications channel normally interconnecting said rotary and modem ports,

(4) switching means selectively connecting its said channel switch into any one of said alternate channels; and

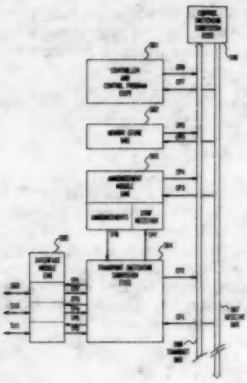
C. a central processing unit connected to each said channel switch by a system bus, said central processing unit acting in response to the failure of modem connected to said modem port of a first one of said channel switches to timely answer a telephone call inbound on said rotary port thereof to select an available second one of said channel switches and an available one of said alternate channels and to condition said switching means of said first and second ones of said channel switches such as to re-route the telephone call from said first one to said second one of said channel switches over said available one of said alternate telecommunications channels.

4,930,152

CALL RETURN TELEPHONE SERVICE

Patrick A. Miller, Red Bank, N.J., assignor to Bell Communications Research, Inc., Livingston, N.J.

Filed Aug. 31, 1988, Ser. No. 238,738
Int. Cl.[5] H04M *3/50*
U.S. Cl. 379—214 **15 Claims**



12. A method of controlling a local telephone switch comprising memory and aural message announcement means to provide a subscribing customer access from any telephone station to specialized telephone call service associated with the customer telephone station served by said switch, said method comprising;

(a) storing in said memory a personal identification number (PIN) specific to said customer;

(b) storing in said memory an identifier of said customer station;

(c) acquiring an identifier of a party calling said customer station;

(d) retrieving from said memory said customer station identifier;

(e) comparing said customer station identifier with said calling party identifier;

(f) delivering aurally to said calling party from said message announcement means, in the event of a matching comparison of said identifiers, a request for the inputting of a PIN at the station of said calling party;

(g) retrieving from said memory said customer-specific PIN;

(h) comparing said customer-specific PIN with said calling party PIN; and

(i) providing said calling party, in the event of a matching comparison of said PINs, access to said specialized service.

4,930,153

PBX VOICE MAIL INTERFACE

Guenter E. Hagedorn, Minnetonka, Minn., assignor to Nicollet Technologies, Inc., Eden Prairie, Minn.

Continuation of Ser. No. 169,964, Mar. 18, 1988, abandoned.
This application Apr. 7, 1989, Ser. No. 338,514
Int. Cl.[5] H04M *3/50, 7/14*
U.S. Cl. 379—233 **1 Claim**

1. A POTS-to-PBX interface comprising:

first connection means for connecting to a POTS (Plain Old Telephone Surface) telephone line;

second connection means for connecting to a PBX (private branch exchange) telephone line;

a network separation relay connected between said first connection means and said second connection means;

a termination impedance selectively connected to said first connection means;

a battery source selectively connected to said second connection means;

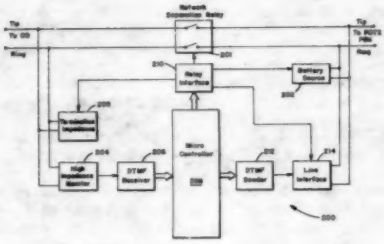
a receiver connected to said first connection means;

a transmitter connected to said second connection means; and

control means connected to said network separation relay, said termination impedance, said battery source, said receiver and said transmitter for performing the steps of:

(a) receiving the telephone number of a called party from the PBX through the receiver;

(b) storing in memory the digits of the received telephone number;



(c) monitoring the second connection means for a request to transmit the stored telephone number;

(d) receiving a request to transmit the stored telephone number;

(e) opening the network separation relay and simultaneously connecting the termination impedance to the first connection means and connecting the battery source to the second connection means;

(f) transmitting the stored telephone number; and

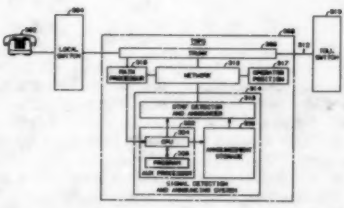
(g) closing the network separation relay and simultaneously disconnecting the battery source from the second connection means and the termination impedance from the first connection means.

4,930,154

AUDIBLE LOGO FOR IDENTIFYING A COMMON CARRIER

Thomas M. Bauer, Belle Mead; Thomas A. Dunn, Edison, both of N.J.; Christina M. Gurke, Naperville, Ill.; John W. Hopkins, Woodridge, Ill., and Richard D. Nafziger, Wheaton, Ill., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Apr. 21, 1989, Ser. No. 341,458
Int. Cl.[5] H04M *3/42*
U.S. Cl. 379—246 **30 Claims**



1. A method of processing a call from an originating customer to a terminating customer station over one of a plurality of common carrier networks, comprising the steps of:

responsive to receipt of a toll call, determining the identity of one of said common carriers for serving said toll call;

responsive to said determining, establishing a connection for said call to a common carrier switch serving said one common carrier;

in said switch, responsive to said determining, prior to connecting said call to an operator position and prior to receipt of billing information from said originating customer, connecting said call to a source of an audible logo identifying said carrier.

4,930,155

MULTIPLE REDIALING SYSTEM

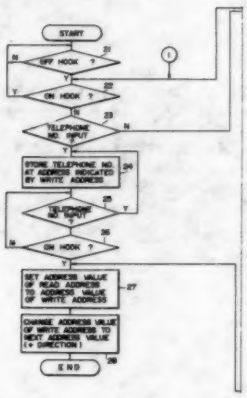
Shunji Kurokawa, Zama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Dec. 22, 1988, Ser. No. 288,564

Claims priority, application Japan, Dec. 24, 1987, 62-328130

Int. Cl.[5] H04M *1/272*

U.S. Cl. 379—354 **8 Claims**


START
OFF HOOK ?
ON HOOK ?
TELEPHONE NO. INPUT
STORE TELEPHONE NO. AT ADDRESS INDICATED BY WRITE ADDRESS
TELEPHONE NO. INPUT ?
ON HOOK ?
SET ADDRESS VALUE OF READ ADDRESS TO ADDRESS VALUE OF WRITE ADDRESS
CHANGE ADDRESS VALUE OF WRITE ADDRESS TO NEXT ADDRESS VALUE (+ DIRECTION)
END

1. A radial system for use in a telephone unit having a handset and connected to a telephone network, comprising:

a plurality of manual selection buttons for inputting a phone number;

storing means for automatically storing the phone number in a memory immediately after the phone number is input, said memory having a capacity for storing a plurality of phone numbers;

input means connecting said plurality of manual selection buttons to said storing means;

retrieval means for retrieving the plurality of phone numbers located in the memory of said storing means on a last-in-first-out basis;

display means for displaying a desired phone number retrieved by said retrieval means; and

automatic call dialing means for automatically calling the desired phone number displayed on said display means when said handset is in an off-hook state.

4,930,156

TELEPHONE RECEIVER TRANSMITTER DEVICE

Elwood G. Norris, Poway, Calif., assignor to Norcom Electronics Corporation, Poway, Calif.

Filed Nov. 18, 1988, Ser. No. 273,216

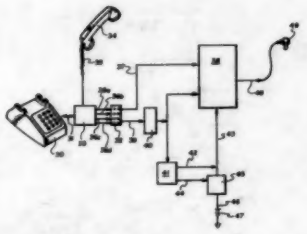
Int. Cl.[5] H04R *1/06*

U.S. Cl. 379—388 **19 Claims**

1. A telephone speaker/microphone device for positioning at a user's ear and for coupling to microphone and speaker leads of a telephone or other communication device to enable hands-free communication in duplex mode without use of a handset, said device comprising:

control circuitry including telephone coupling leads for attachment to the telephone microphone and speaker leads for receiving incoming voice signals from the telephone and for transmitting outgoing voice signals from speaker microphone device to the telephone, said circuitry including secondary leads for transmittance of the respective voice signals to and from a speaker/microphone combination for positioning at the ear and separate from the telephone handset;

a speaker element including positive and negative input leads for driving the speaker element and being configured in size and shape for positioning at the ear, said speaker element being part of the speaker/microphone combination;



a microphone element having an attached drive line capable of carrying voice signal and being configured in size and shape for positioning at the ear and proximate to the speaker element, said speaker element being part of the speaker/microphone combination;

said speaker element and microphone element being wired such that voice signal carried on the drive line of the microphone element is approximately 180 degrees out of phase with voice signal delivered to the speaker element and being physically positioned sufficiently close to result in cancellation of feedback; and

means for transmitting voice signal between the speaker/microphone combination and the control circuitry to electronically couple the speaker and microphone elements to the corresponding secondary leads of the control circuitry.

4,930,157

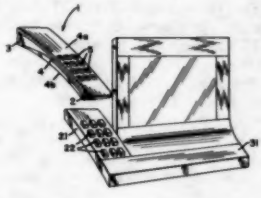
TELEPHONE HANDSET HAVING APERTURES FOR KEY ACCESS

Howard Citron, Katonah; Eric Chan, and Michael Dolan, both of New York, all of N.Y., assignors to Nynex Corporation, White Plains, N.Y.

Filed May 10, 1989, Ser. No. 350,095

Int. Cl.[5] H04M *1/02*

U.S. Cl. 379—433 **7 Claims**



1. A telephone handset for use with a telephone key pad

having a plurality of keys for key actuated dialing, the handset being separate from the key pad and the keys and being able to be brought to a position proximate to the key pad and the keys, the handset comprising:

a transmitter section;

a receiver section;

a body connecting said transmitter and receiver sections, said body having a plurality of apertures each for permitting access to a different one of the keys of the key pad when said body is brought to a position proximate to the key pad.

4,930,158

SELECTIVE VIDEO PLAYING SYSTEM

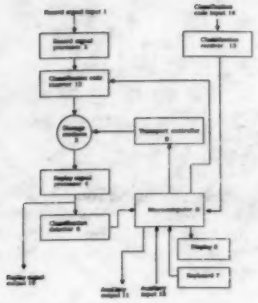
Peter S. Vogel, 28 Adeline St., Faulconbridge, NSW 2776, Australia

Filed Aug. 29, 1988, Ser. No. 237,175

Claims priority, application Australia, Sep. 2, 1987, PI4107

Int. Cl.[5] H04N *7/16*

U.S. Cl. 380—5 **22 Claims**



1. A video recording playing method comprising the steps of:

receiving, from a video storage medium, signals representative of a video program,

processing said signals to produce video signals of a form suitable for display,

detecting a classification code within the signals received from the storage medium, said detected code being indicative of a class of program being played,

inputting from the user a security code number, comparing the number input to a stored number and, if the numbers are equal, enabling selection of a set of classification codes which cause at least one of suspension or termination of playing,

comparing the detected code to said set of classification codes, and

selectively playing the video program according to the result of the comparison.

4,930,159

NETBIOS NAME AUTHENTICATION

Jeffrey K. Kravitz, and Charles C. Palmer, both of Yorktown Heights, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 18, 1989, Ser. No. 298,387

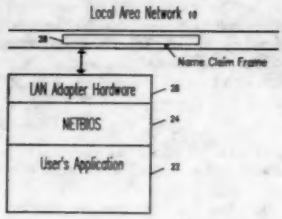
Int. Cl.[5] H04J *15/00*

U.S. Cl. 380—23 **18 Claims**

1. A method for preventing unauthorized workstations from being serviced on a local area network comprising the steps of:

monitoring all broadcast messages on the network to detect name-query messages from workstations attempting to claim names;

decoding a data frame in a name-query message to obtain a



requested name and a unique adapter address of a requesting workstation; and

verifying that a requested name matches a previously assigned adapter address.

4,930,160

AUTOMATIC CENSORSHIP OF VIDEO PROGRAMS

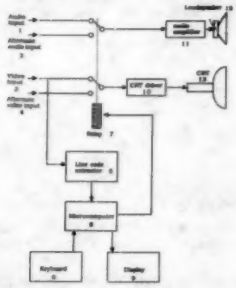
Peter S. Vogel, 28 Adeline Street, Faulconbridge NSW 2776, Australia

Filed Aug. 29, 1988, Ser. No. 237,176

Claims priority, application Australia, Sep. 2, 1987, PI4107

Int. Cl.[5] H04K *1/00*

U.S. Cl. 380—23 **26 Claims**



1. A video program reception method comprising the steps of:

storing in memory means a set of codes descriptive of video program classifications,

receiving a video signal and associated audio signal if present,

receiving a program classification code descriptive of said video signal,

accessing said memory means and comparing the contents thereof with said code, and,

if the result of said comparison indicates that the received program is to be displayed, causing the received video signal to be selected for display,

if the result of said comparison indicates that an alternative video signal is to be displayed, causing an alternative source of video signal to be selected for display; and

displaying the selected video signal on a video display means.

DESIGN PATENTS

GRANTED MAY 29, 1990

ERRATA

For CLASS	See PATENT NO.
D08-307	308,244

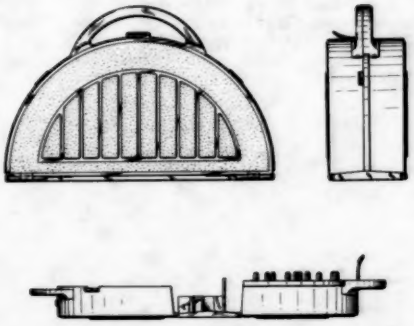
DESIGNS

MAY 29, 1990

308,125
SANDAL
Peter I. Fraser, 912 Lawrence St., No. 1, Eugene, Oreg. 97401
Filed Jan. 25, 1988, Ser. No. 148,218
Term of patent 14 years
U.S. Cl. D2—270

308,126
SHOE SCUFF COVER
Carol D. Lee, 420 S. 17th Ave., Maywood, Ill. 60153
Filed Sep. 23, 1987, Ser. No. 99,986
Term of patent 14 years
U.S. Cl. D2—271

308,127
MINIATURE SEWING BOX
John S. Doyel, 404 W. 20th St., New York, N.Y. 10011
Filed Nov. 4, 1986, Ser. No. 927,410
Term of patent 14 years
U.S. Cl. D3—20



308,128
WATER-BOTTLE
Daniel Paquette, 3132 Desautels Street, Montreal, Canada (H1N 3B7)
Filed Dec. 18, 1986, Ser. No. 946,500
Term of patent 14 years
U.S. Cl. D3—30.1

308,129
TAPE CAROUSEL
Jack G. Walden, Oklahoma City, Okla., assignor to Lebever Co., Oklahoma City, Okla.
Filed Apr. 13, 1987, Ser. No. 37,403
Term of patent 14 years
U.S. Cl. D3—35

308,130
DISKETTE STORAGE UNIT
John E. Sherry, 2910 Neilson Way, #504, Santa Monica, Calif. 90405
Filed Dec. 3, 1986, Ser. No. 937,520
Term of patent 14 years
U.S. Cl. D3—35

308,131

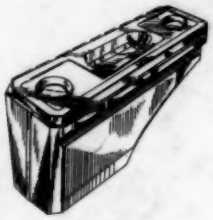
STORAGE BOX FOR USE IN VEHICLES

Ralph M. Marcantonio, 4343 Industrial Center, San Antonio, Tex. 78217

Filed Jun. 8, 1987, Ser. No. 59,870

Term of patent 14 years

U.S. Cl. D3—40



308,132

LUGGAGE CASE

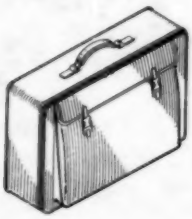
Hyun S. Kim, New Castle, Pa., assignor to Airway Industries, Inc., Ellwood City, Pa.

Filed Jul. 18, 1986, Ser. No. 886,630

The portion of the term of this patent subsequent to May 15, 2004, has been disclaimed.

Term of patent 14 years

U.S. Cl. D3—71



308,133

LUGGAGE CASE

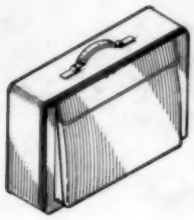
Hyun S. Kim, New Castle, Pa., assignor to Airway Industries, Inc., Ellwood City, Pa.

Filed Jul. 18, 1986, Ser. No. 886,629

The portion of the term of this patent subsequent to May 15, 2004, has been disclaimed.

Term of patent 14 years

U.S. Cl. D3—71



308,134

LUGGAGE CASE

Hyun S. Kim, New Castle, Pa., assignor to Airway Industries, Inc., Ellwood City, Pa.

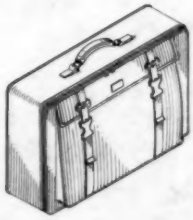
Filed Jul. 18, 1986, Ser. No. 886,627

The portion of the term of this patent subsequent to May 15, 2004, has been disclaimed.

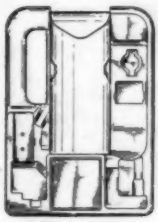
Term of patent 14 years

U.S. Cl. D3—71

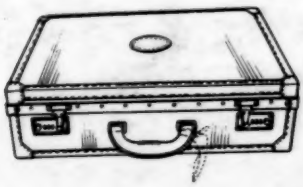
308,135
LUGGAGE CASE
Hyun S. Kim, New Castle, Pa., assignor to Airway Industries, Inc., Ellwood City, Pa.
Filed Jul. 18, 1986, Ser. No. 886,887
The portion of the term of this patent subsequent to May 15, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D3—71



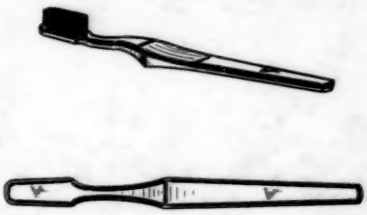
308,136
BASE FOR STORING AND CARRYING A PROPANE TORCH AND ACCESSORIES
David S. Chapin, and William C. Humphrey, both of Raleigh, N.C., assignors to Cooper Industries, Inc., Houston, Tex.
Filed May 1, 1986, Ser. No. 858,520
Term of patent 14 years
U.S. Cl. D3—73



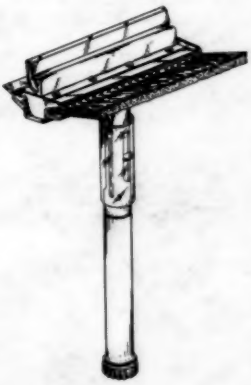
308,137
SUIT-CASE
Francesco Grecchi, Milan, Italy, assignor to Hunting World, Inc., New York, N.Y.
Filed Nov. 24, 1986, Ser. No. 934,528
Claims priority, application Italy, May 30, 1986, 22055/86[U]
Term of patent 14 years
U.S. Cl. D3—76



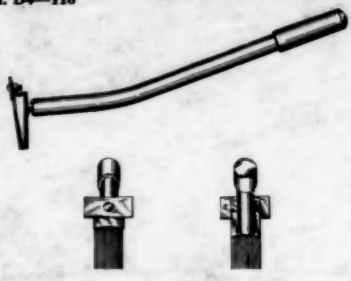
308,138
TOOTHBRUSH
John K. Redmond, Woollahra, Australia, assignor to Johnson & Johnson Consumer Products, Inc., New Brunswick, N.J.
Filed Nov. 23, 1987, Ser. No. 124,183
Claims priority, application Australia, Jun. 12, 1987, 1685/87
Term of patent 14 years
U.S. Cl. D4—104



308,139
TRIPLE HEAD SURFACE CLEANING DEVICE
Israel Viner, 1411 N. Curson Ave. #1, Los Angeles, Calif. 90046
Filed Apr. 10, 1987, Ser. No. 36,695
Term of patent 14 years
U.S. Cl. D4—118



308,140
COMBINED BRUSH AND SCRAPER
Thomas L. Klamm, 2053 N. Wisconsin St., Racine, Wis. 53402
Filed Sep. 25, 1987, Ser. No. 101,275
Term of patent 14 years
U.S. Cl. D4—118



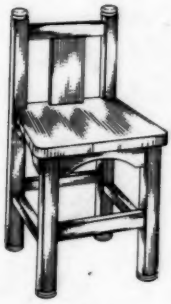
308,141
CHAIR
John C. Genova; Nancy J. Genova, both of Villa Park, Calif.; George Merganov, Longwood, Fla., and Charles Genova, La Verne, Calif., assignors to John Charles Designs, Inc., Cerritos, Calif.
Filed Oct. 16, 1989, Ser. No. 421,702
Term of patent 14 years
U.S. Cl. D6—334

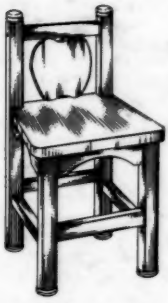
308,142
FOLDING CHAIR
Michael C. Wilson, Glen Ellyn, Ill., assignor to Tyke Corporation, Chicago, Ill.
Filed Feb. 20, 1987, Ser. No. 17,196
Term of patent 14 years
U.S. Cl. D6—368

308,143
CHAIR
Hartmut Lohmeyer, Munich, Fed. Rep. of Germany, assignor to Krueger International, Inc., Green Bay, Wis.
Filed Sep. 16, 1985, Ser. No. 776,213
Term of patent 14 years
U.S. Cl. D6—379

308,144
CHAIR
Richard D. McCarthy, 280 Halcyon Ave., and William P. Taylor, 244 Lamplighter Cir., both of Winston-Salem, N.C. 27104
Filed Mar. 13, 1987, Ser. No. 25,772
Term of patent 14 years
U.S. Cl. D6—380

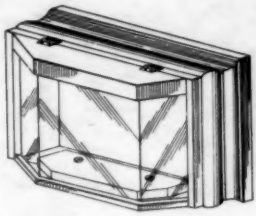
308,145
CHAIR
Phyllis J. Hoff, P.O. Box 1445, Sutter Creek, Calif. 95685
Filed Mar. 9, 1987, Ser. No. 23,524
Term of patent 14 years
U.S. Cl. D6—380



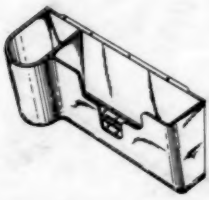


308,146
CONTACT LENS DISPENSER
Edwin A. Speaker, 228 East Ave., Brockport, N.Y. 14420
Filed Jan. 11, 1988, Ser. No. 141,660
Term of patent 14 years
U.S. Cl. D6—515

308,147
WALL MOUNTED DISPLAY CASE
Yen Pei-Ai, 5F No. 1, Lane 130, Chaochow St., Taipei, Taiwan
Filed Feb. 26, 1987, Ser. No. 19,224
Term of patent 14 years
U.S. Cl. D6—559



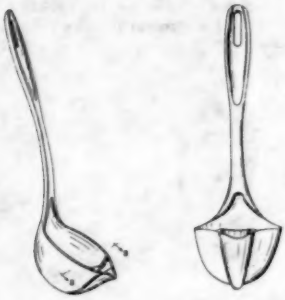
308,148
MAGNETIC-MOUNT SMALL ARTICLE HOLDER
Stephen T. Meyer, Carmel, Ind., assignor to Deflecto Corporation, Indianapolis, Ind.
Filed Dec. 8, 1986, Ser. No. 939,014
Term of patent 14 years
U.S. Cl. D6—567



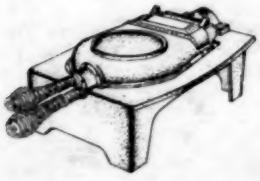
308,149
PATTERNED MAT FOR TOY VEHICLES
Mary E. Lewis, St. Louis County, Mo., and Priscilla R. Middleton, King County, Wash., assignors to Brio Scanditoy Corporation, Milwaukee, Wis.
Filed Jun. 19, 1987, Ser. No. 63,850
Term of patent 14 years
U.S. Cl. D6—588

308,150
PILLOW
Stanley Salmirs, 70 W. 40th St., New York, N.Y. 10018
Filed Dec. 6, 1984, Ser. No. 679,125
Term of patent 14 years
U.S. Cl. D6—601

308,151
LADLE
Leo B. Roberts, and Emma F. Roberts, both of Rte. 1, Box 170, Marthasville, Mo. 63357
Filed Oct. 3, 1983, Ser. No. 538,336
Term of patent 14 years
U.S. Cl. D7—691

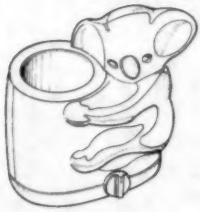


308,152
WAFFLE IRON
George Tzouflas, 38-15 10th St., Long Island City, N.Y. 11101
Filed Mar. 31, 1986, Ser. No. 847,587
Term of patent 14 years
U.S. Cl. D7—352

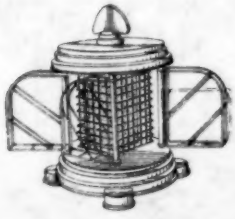


308,153
INSULATED BEVERAGE SERVER
Harry F. Collins, Minnetonka, Minn., assignor to Service Ideas, Inc., Minneapolis, Minn.
Filed Mar. 23, 1987, Ser. No. 29,462
Term of patent 14 years
U.S. Cl. D7—322

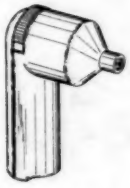
308,154
BABY BOTTLE WARMER
Gregory M. Tow, Ashfield, Australia, assignor to Sunbeam Corporation, Campsie, Australia
Filed Mar. 27, 1987, Ser. No. 32,074
Claims priority, application Australia, Jan. 27, 1987, 0229/87
Term of patent 14 years
U.S. Cl. D7—326



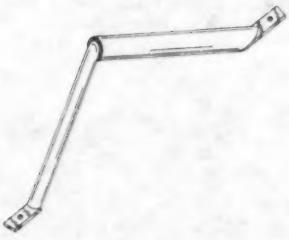
308,155
TOASTER
Brunhilde Lauer, Koppelgasse 5, 3573 Gemuenden, Fed. Rep. of Germany
Filed Dec. 28, 1987, Ser. No. 138,030
Term of patent 14 years
U.S. Cl. D7—328



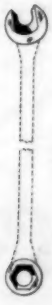
308,156
MIXER
Jan F. van Asten, Leek, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Jul. 10, 1986, Ser. No. 884,922
Claims priority, application Benelux, Jan. 17, 1986, 60733-01
Term of patent 14 years
U.S. Cl. D7—379



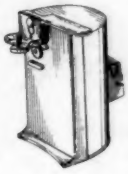
308,157
AUXILIARY HANDLE FOR A SHOVEL
Theodore R. Maxian, 48 Crestmont Rd., Binghamton, N.Y. 13905
Filed Feb. 25, 1987, Ser. No. 18,908
Term of patent 14 years
U.S. Cl. D8—10

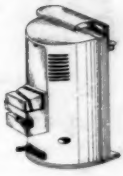


308,158
END PORTIONS OF A DOUBLE-ENDED WRENCH
Charles M. Harris, 1071 Casilada Way, Sacramento, Calif. 95822
Filed Apr. 23, 1987, Ser. No. 41,769
Term of patent 14 years
U.S. Cl. D8—21



308,159
CAN OPENER
Franz A. Stützer, Offenbach am Main, Fed. Rep. of Germany, assignor to Rowenta-Werke GmbH, Offenbach am Main, Fed. Rep. of Germany
Filed Mar. 28, 1988, Ser. No. 174,018
Claims priority, application Fed. Rep. of Germany, Oct. 2, 1987, 5MR10792
Term of patent 14 years
U.S. Cl. D8—35



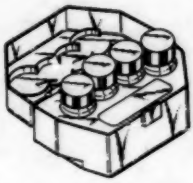


308,160
TORCH STAND
Henry D. Sweeny, Kitchener, and Antonio D. Sabbadin, Waterloo, both of Canada, assignors to Swenco Limited, Waterloo, Canada
Division of Ser. No. 39,059, Apr. 16, 1987, abandoned. This application Aug. 10, 1989, Ser. No. 394,268
Claims priority, application Canada, Oct. 23, 1986, 23-10-86-2
Term of patent 14 years
U.S. Cl. D8—71

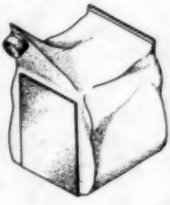
308,161
FURNITURE CASTOR
Raymond R. J. Daniels, Norfolk, England, assignor to Guy-Raymond Engineering Company, Ltd., Norfolk, England
Filed Oct. 7, 1986, Ser. No. 916,463
Claims priority, application United Kingdom, Apr. 9, 1986, 1033324; Apr. 9, 1986, 1033326
Term of patent 14 years
U.S. Cl. D8—375

308,162
AEROSOL CONTAINER
Tomio Nitta, Yokohama, Japan, assignor to Tokai Corporation, Yokohama, Japan
Continuation-in-part of Ser. No. 925,931, Nov. 3, 1986. This application Mar. 3, 1987, Ser. No. 21,026
Claims priority, application Japan, Oct. 23, 1986, 61-41736
Term of patent 14 years
U.S. Cl. D9—300

308,163
FLUID CONTAINER OR THE LIKE
Robert C. Hollar, Wildwood, and Tung-Ming Huang, Elk Grove Village, both of Ill., assignors to Abbott Laboratories, North Chicago, Ill.
Filed Jan. 27, 1986, Ser. No. 822,701
The portion of the term of this patent subsequent to Aug. 9, 2002, has been disclaimed.
Term of patent 14 years
U.S. Cl. D9—341



308,164
FLEXIBLE CONTAINER
Michel Cazes, 84, rue Jean Bouin, 88800 Vittel, France
Filed Oct. 24, 1986, Ser. No. 923,733
Claims priority, application France, Apr. 24, 1986, 140
Term of patent 14 years
U.S. Cl. D9—373



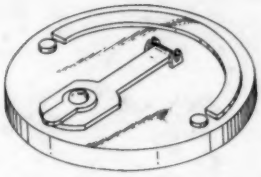
308,165
BOTTLE
Juris M. Mednis, Howell, N.J., assignor to Universal Symetrics Corporation, Howell, N.J.
Filed Oct. 23, 1987, Ser. No. 111,706
Term of patent 14 years
U.S. Cl. D9—375

308,166
BOTTLE
Richard L. Weckman, Perrysburg, Ohio, assignor to Owens-Illinois Plastic Products Inc., Toledo, Ohio
Filed Feb. 16, 1988, Ser. No. 156,150
Term of patent 14 years
U.S. Cl. D9—375

308,167
BOTTLE
Gary D. Holmes, Independence, Mo., assignor to Travomatic Corporation, Kansas City, Mo.
Filed Dec. 21, 1987, Ser. No. 135,284
Term of patent 14 years
U.S. Cl. D9—390

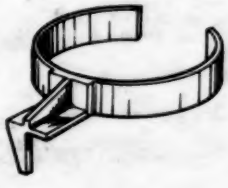
308,168
BOTTLE
Nicola Trussardi, Milan, Italy, assignor to Trussardi S.p.A., Milan, Italy
Filed Jan. 28, 1987, Ser. No. 7,566
Claims priority, application Italy, Jul. 28, 1986, 22664/86[U]
Term of patent 14 years
U.S. Cl. D9—403

308,169
CAN CAP
Debora S. Auman, #1 Sargeant St., Hampton, Va. 23663
Filed Aug. 20, 1986, Ser. No. 898,089
Term of patent 14 years
U.S. Cl. D9—446



308,170
DISPENSING NOZZLE FOR PLASTIC BAGS
Harry B. Wilfong, Jr., Hartsville, S.C., assignor to Sonoco Products Company, Hartsville, S.C.
Filed Jan. 22, 1988, Ser. No. 146,981
Term of patent 14 years
U.S. Cl. D9—447

308,171
FEED DIAL TRAVELING INDICATOR
Edward T. Haas, Jr., 6882 Trigo Rd., Goleta, Calif. 93117
Filed Jul. 8, 1987, Ser. No. 71,053
Term of patent 14 years
U.S. Cl. D10—46



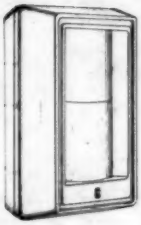
308,172
CLINICAL THERMOMETER
Hikaru Ishikawa, and Takashi Sano, both of Tokyo, Japan, assignors to Pigeon Co., Ltd., Tokyo, Japan
Filed Jun. 19, 1987, Ser. No. 64,124
Term of patent 14 years
U.S. Cl. D10—57

308,173
WINDOW THERMOMETER
Robert E. Bescherer, Bristol, and Barry D. Colvin, Hope, both of R.I., assignors to Aspects, Inc., Warren, R.I.
Filed May 24, 1989, Ser. No. 356,286
Term of patent 14 years
U.S. Cl. D10—57

308,174
MEASURING INSTRUMENT
Cornelis E. Rijlaarsdam, 48 Julianastraat, Alphen aan den Rijn, Netherlands
Filed Oct. 9, 1985, Ser. No. 785,826
Term of patent 14 years
U.S. Cl. D10—70

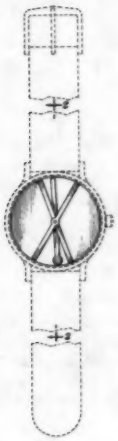
308,175
LIGHTNING DETERRENT
Ihor Sulyma, Atco, N.J., assignor to Cross Keys Manufacturing, Inc., Berlin, N.J.
Filed Apr. 24, 1987, Ser. No. 41,918
Term of patent 14 years
U.S. Cl. D10—105

308,176
MICROWAVE AND PASSIVE INFRARED INTRUSION DETECTOR
Richard Soloway, 2 Richmond Rd., Lido Beach, N.Y. 11566, and Richard Farrell, 84 Claire Ct., West Babylon, N.Y. 11704
Filed Sep. 23, 1986, Ser. No. 910,768
The portion of the term of this patent subsequent to Aug. 22, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D10—106



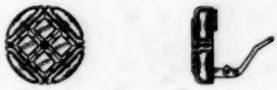
308,177
TEMPERATURE ACTIVATED ALARM FOR FIRE FIGHTERS
Frederick A. Parker, Pheasant Run, and Mark P. Grady, Norristown, both of Pa., assignors to Rampart Corporation, Hatboro, Pa.
Filed Feb. 4, 1988, Ser. No. 152,059
Term of patent 14 years
U.S. Cl. D10—106

308,178
COMBINED DIAL AND HANDS FOR A TIMEPIECE
John Zaboyan, 321 Waterside Pl., Little Ferry, N.J. 07643
Filed Feb. 2, 1987, Ser. No. 10,123
Term of patent 14 years
U.S. Cl. D10—124

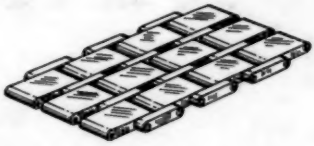


308,179
EARRING
David Perlmutter, and Jay Perlmutter, both of 520 SW. 62nd Way, Margate, Fla. 33068
Filed Nov. 5, 1986, Ser. No. 927,424
Term of patent 14 years
U.S. Cl. D11—44

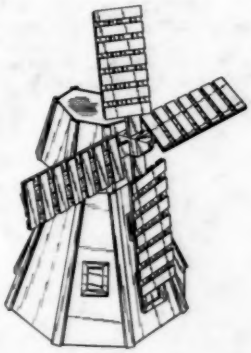
308,180
EARRING OR SIMILAR ARTICLE
Paolo Bulgari, Rome, Italy, assignor to Partecipazioni Bulgari S.p.A., Rome, Italy
Filed Jul. 13, 1988, Ser. No. 218,042
Claims priority, application Int'l Pat. Institute, Jan. 14, 1988, DM/010065
Term of patent 14 years
U.S. Cl. D11—76



308,181
CHAIN LINKS FOR A WATCHBAND
Damien Munnier, Damprichard, France, assignor to Munnier Freres S.A., Damprichard, France
Filed Nov. 24, 1986, Ser. No. 934,145
Claims priority, application World Int. Prop. O., May 26, 1986, DM/006967
Term of patent 14 years
U.S. Cl. D11—93



308,182
WINDMILL ORNAMENT OR THE LIKE
Henry V. Miller, Box 1366, McAlester, Okla. 74501
Filed Oct. 9, 1987, Ser. No. 116,111
Term of patent 14 years
U.S. Cl. D11—157

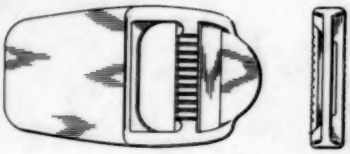


308,183
TABLE ORNAMENT
Jean W. Heap, Gwynedd, Wales, assignor to Pendelfin Studios Limited, England
Filed May 18, 1987, Ser. No. 51,040
Claims priority, application United Kingdom, Mar. 6, 1987, 1040552
Term of patent 14 years
U.S. Cl. D11—158

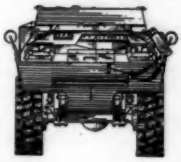
308,184
TABLE ORNAMENT
Doreen N. Roberts, Gwynedd, Wales, assignor to Pendelfin Studios Limited, England
Filed May 18, 1987, Ser. No. 51,074
Claims priority, application United Kingdom, Mar. 6, 1987, 1040551
Term of patent 14 years
U.S. Cl. D11—158

308,185
BOW FOR A PACKAGE
Carol A. Valkner, Rte. 3, Box 76523, 17th Ave., South Haven, Mich. 49090
Filed Oct. 14, 1986, Ser. No. 918,806
Term of patent 14 years
U.S. Cl. D11—184

308,186
FLEXIBLE WEB RESTRAINING BUCKLE
Mark J. Udelhofen, Park Ridge, and Timothy J. Rapinchuk, Des Plaines, both of Ill., assignors to Illinois Tool Works, Inc., Chicago, Ill.
Filed Feb. 24, 1987, Ser. No. 18,136
Term of patent 14 years
U.S. Cl. D11—218

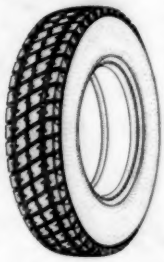


308,187
ARMORED VEHICLE
James A. Ottevaere; James C. LeBlanc, and Richard S. LeBlanc, all of 2340 Alger, Troy, Mich. 48083
Filed May 19, 1986, Ser. No. 864,907
Term of patent 14 years
U.S. Cl. D12—12



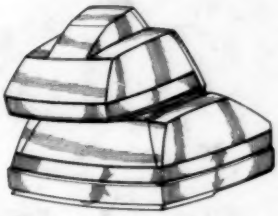
308,188
VEHICLE TIRE
Silvana Hinrichsen, and Alessandro Ceccarelli, both of Rome, Italy, assignors to Bridgestone/Firestone, Inc., Akron, Ohio
Filed Dec. 18, 1987, Ser. No. 135,191
Claims priority, application Italy, Jul. 16, 1987, 53528/87[U]
Term of patent 14 years
U.S. Cl. D12—146

308,189
VEHICLE TIRE
Silvana Hinrichsen, and Alessandro Ceccarelli, both of Rome, Italy, assignors to Bridgestone/Firestone, Inc., Akron, Ohio
Filed Dec. 18, 1987, Ser. No. 135,104
Claims priority, application Italy, Jul. 16, 1987, 53527/87[U]
Term of patent 14 years
U.S. Cl. D12—147



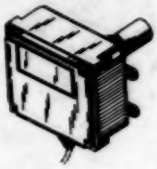
308,190
TIRE
Harold D. Fetty, Asheville, N.C., and Deborah K. Vaughn, Mogadore, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed Jan. 21, 1988, Ser. No. 146,750
Term of patent 14 years
U.S. Cl. D12—147

308,191
MOTORCYCLE REAR TRUNK UNIT
Toshiyuki Yamada, Saitama, and Eiji Hamano, Tokyo, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Nov. 20, 1987, Ser. No. 123,431
Term of patent 14 years
U.S. Cl. D12—158



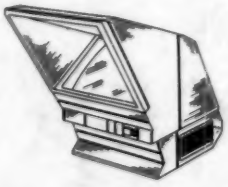
308,192
BOAT FENDER
Richard P. Ellison, Alexandria, Va., assignor to Boat America Corporation, Alexandria, Va.
Filed Jan. 25, 1988, Ser. No. 147,918
Term of patent 14 years
U.S. Cl. D12—168

308,193
LEVEL SENSING SWITCH
Mark K. Gaalswyk, R.R. 1, Box 85, Welcome, Minn. 56181
Filed May 1, 1987, Ser. No. 44,570
Term of patent 14 years
U.S. Cl. D13—158

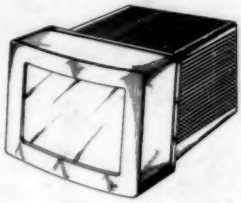


308,194
COMPUTER TERMINAL WITH DETACHABLE KEYBOARD
Stephen J. Messerschmidt, Laguna Hills, and James E. Grove, Van Nuys, both of Calif., assignors to Informer, Inc., Garden Grove, Calif.
Filed Jun. 26, 1987, Ser. No. 66,646
Term of patent 14 years
U.S. Cl. D14—106

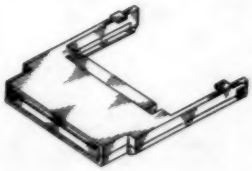
308,195
CRT VISUAL DISPLAY TERMINAL
Frank J. Profumo, New Orleans, La., assignor to The Laitram Corporation, Harahan, La.
Filed Jul. 14, 1986, Ser. No. 885,501
Term of patent 14 years
U.S. Cl. D14—113



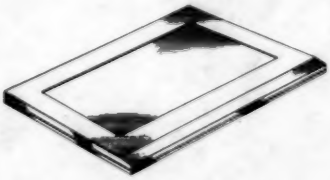
308,196
VIDEO DISPLAY FOR A COMPUTER
Sigmar Willnauer, Portola Valley, Calif., assignor to Apple Computer, Inc., Cupertino, Calif.
Filed Mar. 23, 1987, Ser. No. 29,407
The portion of the term of this patent subsequent to May 22, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D14—113



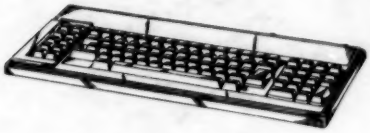
308,197
ADAPTOR FOR A GAME MACHINE CARTRIDGE
Yoshihiro Inoue, Kyoto, Japan, assignor to Nintendo Company Limited, Kyoto, Japan
Filed Jan. 9, 1987, Ser. No. 2,000
Claims priority, application Japan, Oct. 14, 1986, 61-40907
Term of patent 14 years
U.S. Cl. D14—114



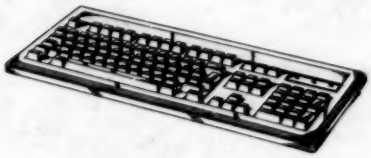
308,198
DIGITIZING TABLET FOR COMPUTER INPUT
Thomas A. Tedham, Salem, and Kenichi Akagi, Littleton, both of Mass., assignors to Wang Laboratories, Inc., Lowell, Mass.
Filed Oct. 20, 1988, Ser. No. 260,546
The portion of the term of this patent subsequent to May 22, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D14—114



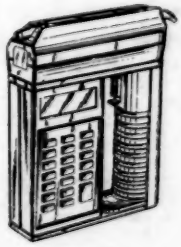
308,199
KEYBOARD
Ettore Sottsass, Milan, Italy, assignor to Ing. C. Olivetti & C., S.p.A., Torino, Italy
Filed Dec. 7, 1987, Ser. No. 129,085
Claims priority, application Italy, Jun. 15, 1987, 53421/87[U]
Term of patent 14 years
U.S. Cl. D14—115



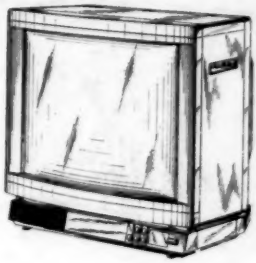
308,200
KEYBOARD
Ettore Sottsass, Milan, Italy, assignor to Ing C. Olivetti & C., S.p.A., Torino, Italy
Filed Dec. 7, 1987, Ser. No. 129,086
Claims priority, application Italy, Jun. 15, 1987, 55422-/87[U]
Term of patent 14 years
U.S. Cl. D14—115



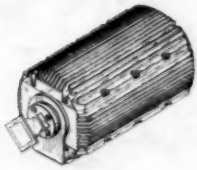
308,201
PORTABLE DATA SCANNER
John Doyle, West Chester, Pa.; Louis J. Frontino, Cherry Hill, N.J., and Bob M. Dobbins, Villanova, Pa., assignors to Mars Incorporated, McLean, Va.
Filed Sep. 25, 1987, Ser. No. 101,152
Term of patent 14 years
U.S. Cl. D14—116



308,202
TELEVISION RECEIVER
Teiyu Gotoh, Urawa; Keiichi Totsuka, Hiratsuka, both of Japan, and Ira Diamond, Ramsey, N.J., assignors to Sony Corporation, Tokyo, Japan
Filed Jul. 20, 1987, Ser. No. 75,079
Claims priority, application Japan, Mar. 6, 1987, 62-8402
Term of patent 14 years
U.S. Cl. D14—126

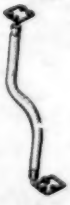


308,203
TRANSMISSION AND RECEPTION UNIT FOR A MINI-EARTH STATION
Yuhei Kosugi; Hirohisa Ozawa; Osamu Yamamoto, and Yoshio Minowa, all of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan
Filed Jul. 17, 1986, Ser. No. 886,467
Claims priority, application Japan, Jan. 17, 1986, 61-1334; Apr. 17, 1986, 61-14450; May 2, 1986, 61-16734
Term of patent 14 years
U.S. Cl. D14—230

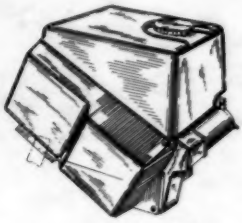


308,204
INDOOR ANTENNA
Akio Takizawa, Tokyo, Japan, assignor to Nippon Antenna Co., Ltd., Tokyo, Japan
Filed Jan. 8, 1987, Ser. No. 1,551
Claims priority, application Japan, Sep. 12, 1986, 61-36028
Term of patent 14 years
U.S. Cl. D14—235

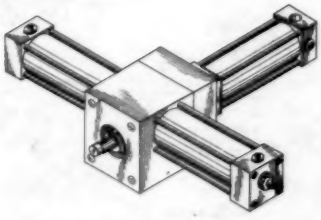
308,205
HOLDER FOR CELLULAR TELEPHONE
Ronald W. Tholberg, Encino, Calif., assignor to Elizabeth H. Tholberg, Tarzana, Calif.
Filed May 15, 1987, Ser. No. 50,073
Term of patent 14 years
U.S. Cl. D14—253



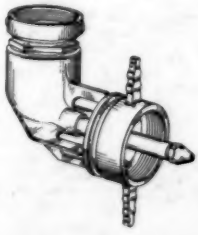
308,206
ENGINE
Gordon D. Kelly, Elm Grove, Wis., and Ronald J. Hoffman, Phoenix, Ariz., assignors to Kohler Co., Kohler, Wis.
Filed Jul. 21, 1988, Ser. No. 222,683
Term of patent 14 years
U.S. Cl. D15—1



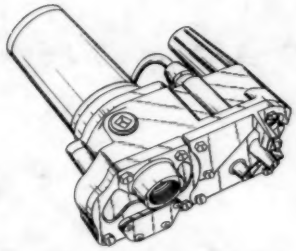
308,207
FLUID-OPERATED MULTIMOTION ACTUATOR
David W. Burke, Cape Elizabeth, Me., assignor to Motion Controls and Automation, Inc., Cape Elizabeth, Me.
Filed Jun. 27, 1988, Ser. No. 214,577
Term of patent 14 years
U.S. Cl. D15—7



308,208
JET FOOT PUMP
Michael P. Ziaylek, and Theodore Ziaylek, Jr., both of 140 Riverview Dr., Yardley, Pa. 19067
Filed Apr. 10, 1987, Ser. No. 36,812
Term of patent 14 years
U.S. Cl. D15—7



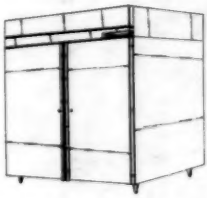
308,209
GEAR-PUMP ASSEMBLY FOR LIQUID PRODUCTS
Fred L. Laqua, and Robert E. Hall, both of Wichita, Kans., assignors to Great Plains Industries, Inc., Wichita, Kans.
Filed Nov. 17, 1987, Ser. No. 121,997
Term of patent 14 years
U.S. Cl. D15—7



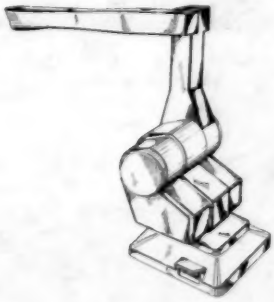
308,210
PORTABLE INTERNAL COMBUSTION POWER TOOL
Katsumi Kiyooka, Warabi, and Hideko Inomata, Higashiyamato, both of Japan, assignors to Komatsu Zenoah Company, Tokyo, Japan
Filed Mar. 18, 1987, Ser. No. 27,668
Term of patent 14 years
U.S. Cl. D15—10

308,211
HYDRO JET EXCAVATION NOZZLE
George J. Magnera, 19188 Glendale, Hesperia, Calif. 92345
Filed Jun. 21, 1988, Ser. No. 209,357
Term of patent 14 years
U.S. Cl. D15—21

308,212
UPRIGHT REFRIGERATION UNIT
Brian L. Dallman, Hudson, Wis., assignor to Nor-Lake, Inc., Hudson, Wis.
Filed Oct. 26, 1987, Ser. No. 113,617
Term of patent 14 years
U.S. Cl. D15—85



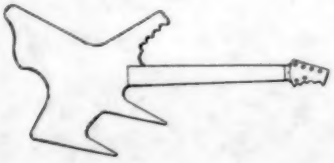
308,213
ELECTRIC ROBOT
Gary L. Jones, Madison Heights; Robert J. Todd, Milford Township, Oakland County; Norman N. Fender, Hudson; Dale A. Wood, Canton, all of Mich., and Alexander Bally, Carnegie, Pa., assignors to Graco Inc., Minneapolis, Minn.
Filed Oct. 6, 1987, Ser. No. 106,706
Term of patent 14 years
U.S. Cl. D15—199



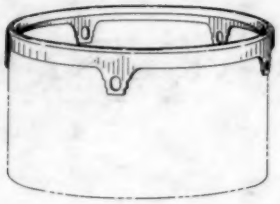
308,214
CAMERA
Noboru Tanaka, Kawasaki, and Michio Hirohata, Inagi, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Jul. 16, 1986, Ser. No. 886,048
Claims priority, application Japan, Jan. 20, 1986, 61-1789
The portion of the term of this patent subsequent to Mar. 6, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D16—209

308,215
ELECTRONIC PIANO
Tatsuo Katsuhara, Hachioji, Japan, assignor to Caiso Computer Co., Ltd., Tokyo, Japan
Filed Aug. 31, 1987, Ser. No. 91,522
Term of patent 14 years
U.S. Cl. D17—7

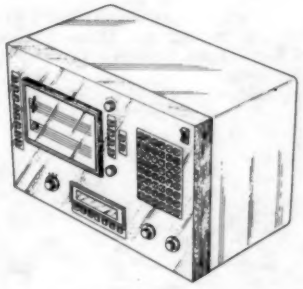
308,216
GUITAR
Joel M. Harriott, 3000 J St. SW., #1905, Cedar Rapids, Iowa 52404
Filed Feb. 27, 1987, Ser. No. 19,993
Term of patent 14 years
U.S. Cl. D17—14



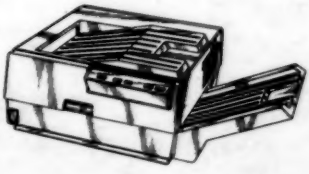
308,217
DRUM HEAD RING
Martin B. Cohen, North Bergen, N.J., assignor to Latin Percussion, Inc., Garfield, N.J.
Filed Mar. 18, 1988, Ser. No. 169,731
Term of patent 14 years
U.S. Cl. D17—22



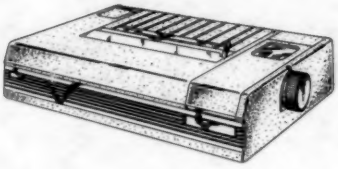
308,218
MUSICAL COMPOSER
Joseph R. Sinkler, Jr., 2731 Eastern, SE., Grand Rapids, Mich. 49507
Filed Apr. 20, 1987, Ser. No. 40,151
Term of patent 14 years
U.S. Cl. D17—99



308,219
DESKTOP PAGE PRINTER
Kazuo Yoshida, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan
Filed Aug. 26, 1986, Ser. No. 900,630
Term of patent 14 years
U.S. Cl. D18—13

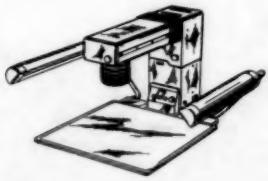


308,220
PRINTER
David S. Urbanus, North Easton, and Peter B. Barron, Billerica, both of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.
Filed Jul. 13, 1987, Ser. No. 56,837
Term of patent 14 years
U.S. Cl. D18—13



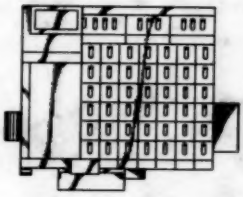
308,221
LASER BEAM PRINTER
Tatsuo Kojima, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Jul. 2, 1987, Ser. No. 69,575
Claims priority, application Japan, Jan. 6, 1987, 62-190
Term of patent 14 years
U.S. Cl. D18—13

308,222
DOCUMENT RECORDER
Hiroshi Sano, Yokohama, and Tadashi Ishikawa, Urawa, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Sep. 23, 1986, Ser. No. 910,773
Claims priority, application Japan, Mar. 28, 1986, 61-11555
Term of patent 14 years
U.S. Cl. D18—36



308,223
COMBINED COLLAPSIBLE GREETING CARD AND TOY
James R. Dudley, El Segundo, Calif., assignor to Gibson Greetings, Inc., Cincinnati, Ohio
Filed Jul. 16, 1987, Ser. No. 74,478
Term of patent 14 years
U.S. Cl. D19—1

308,224
COMBINED PERPETUAL CALENDAR AND FILE
Allan Blacker, 114 Barbara Cir., Ocean Springs, Miss. 39564
Filed Jul. 25, 1985, Ser. No. 758,867
Term of patent 14 years
U.S. Cl. D19—21

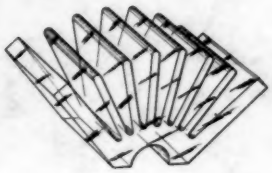


308,225
BOOK COVER
Timothy J. Dressler, North Hollywood, Calif., assignor to Mark L. Chutick, Chatsworth, Calif.
Filed Jul. 13, 1987, Ser. No. 72,580
Term of patent 14 years
U.S. Cl. D19—26

308,226
BALL-POINT PEN
Suk J. Kim, Seoul, Rep. of Korea; Atsushi Deguchi, Tokyo, and Sadao Yoshinaga, Ichikawa, both of Japan, assignors to Yoshinaga Prince Company Limited, Tokyo, Japan
Filed Feb. 26, 1987, Ser. No. 19,491
Claims priority, application Japan, Sep. 19, 1986, 61-37072
Term of patent 14 years
U.S. Cl. D19—42

308,227
COPY HOLDER
Mel Evenson, San Pedro, Calif., assignor to Eldon Industries, Inc., Inglewood, Calif.
Filed Apr. 21, 1986, Ser. No. 857,426
Term of patent 14 years
U.S. Cl. D19—88

308,228
DESK FILE
Bruno Gecchelin, Milan, Italy, assignor to Fratelli Guzzini S.p.A., Recanati, Italy
Filed Jul. 15, 1987, Ser. No. 73,418
Claims priority, application Italy, Jan. 20, 1987, 20550/87[U]
Term of patent 14 years
U.S. Cl. D19—90

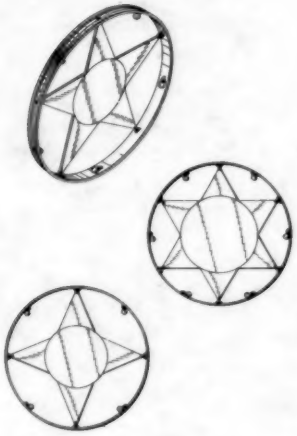


308,229
SIGN FOR ADVERTISING OR SIMILAR USE
Donald L. Jervis, Sr., 6017 Atlantic Blvd., Maywood, Calif. 90270
Filed Apr. 18, 1988, Ser. No. 183,036
Term of patent 14 years
U.S. Cl. D20—31

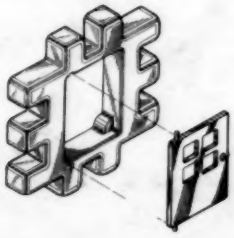
308,230
BEER TAP REPLICA ADVERTISING UNIT
Steve E. Holloway, 1202 Land Rush Dr., Arlington, Tex. 76012
Filed Jun. 5, 1986, Ser. No. 871,671
Term of patent 14 years
U.S. Cl. D20—37

308,231
TOY GLIDER
John F. Winnick, 3051 Briand, La Jolla, Calif. 92037
Filed Nov. 21, 1986, Ser. No. 933,688
Term of patent 14 years
U.S. Cl. D21—89

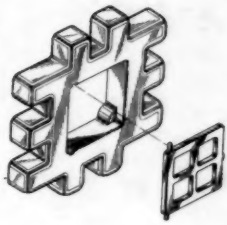
308,232
DECORATIVE WHEEL
Thayard A. McGuire, 11713 Winn Rd., Riverview, Fla. 33569
Continuation-in-part of Ser. No. 488,364, Apr. 25, 1983, Pat. No. 284,295. This application Jun. 17, 1986, Ser. No. 875,747
Term of patent 14 years
U.S. Cl. D21—101



308,233
CONSTRUCTION TOY DOOR BLOCK
Thomas E. Fish, Jr., Wickliffe, Ohio, assignor to The Little Tikes Company, Hudson, Ohio
Filed Sep. 16, 1988, Ser. No. 245,079
Term of patent 14 years
U.S. Cl. D21—108



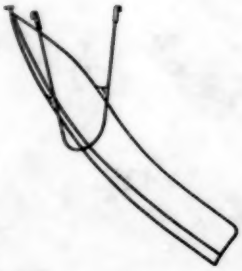
308,234
CONSTRUCTION TOY WINDOW BLOCK
Thomas E. Fish, Jr., Wickliffe, Ohio, assignor to The Little Tikes Company, Hudson, Ohio
Filed Sep. 16, 1988, Ser. No. 245,073
Term of patent 14 years
U.S. Cl. D21—108



308,235
EXERCISE BICYCLE
Edward H. Meisner, Short Hills, N.J., assignor to Voit Sports Incorporated, Fairport, N.Y.
Filed Aug. 4, 1988, Ser. No. 228,239
Term of patent 14 years
U.S. Cl. D21—194

308,236
DOWN MARKER
James J. Egender, 8919 Booth, Kansas City, Mo. 64138
Filed Jul. 24, 1987, Ser. No. 77,320
Term of patent 14 years
U.S. Cl. D21—199

308,237
BASKETBALL RETURN DEVICE
Richard P. McCullough, 1204 Nicole, Apt. 1614, Ft. Worth, Tex. 76120
Filed Jul. 27, 1987, Ser. No. 78,574
Term of patent 14 years
U.S. Cl. D21—201



308,238
ALIGNMENT SYSTEM ELEMENTS OF A GOLF PUTTER
Nicholas J. Francu, 406 Iveys Scenic Dr., Albany, Ga. 31707
Filed Sep. 8, 1987, Ser. No. 93,861
Term of patent 14 years
U.S. Cl. D21—219

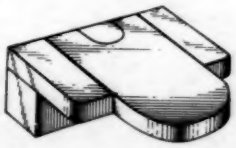
308,239
SKI
Philippe Olivier, Seynod, France, assignor to Salomon S.A., France
Filed Apr. 22, 1988, Ser. No. 184,700
Term of patent 14 years
U.S. Cl. D21—229

308,240
RECLOSABLE COUPLING FOR A FISHING LINE, OR THE LIKE
Carroll A. Buchanan, 11492 Catalina Dr., Lusby, Md. 20657
Filed May 12, 1987, Ser. No. 48,786
Term of patent 14 years
U.S. Cl. D22—134

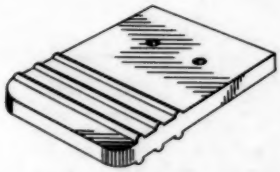
308,241
EXCHANGEABLE FISHING SINKER
John T. Underberg, 507 S. Walnut, Jefferson, Iowa 50129
Filed Jul. 6, 1987, Ser. No. 70,319
Term of patent 14 years
U.S. Cl. D22—145

308,242
LURE RETRIEVER HANDLE
Steven D. Cedergreen, Seattle, Wash., assignor to Tempress Incorporated, Seattle, Wash.
Filed Aug. 3, 1987, Ser. No. 81,125
Term of patent 14 years
U.S. Cl. D22—149

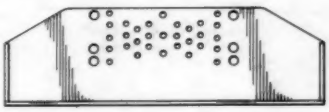
308,243
FAUCET
Joseph Strignano, New York, N.Y., assignor to I.W. Industries, Melville, N.Y.
Filed Apr. 16, 1987, Ser. No. 39,638
Term of patent 14 years
U.S. Cl. D23—241



308,244
TOILET SEAT LIFTING TAB
Demetria M. Leonakis, 16231 Eucalyptus, #22, Bellflower, Calif. 90706
Filed Jan. 19, 1988, Ser. No. 145,205
Term of patent 14 years
U.S. Cl. D8—307

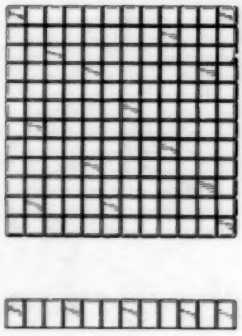


308,245
ELECTRIC AMBIENT CONTROL UNIT FOR BEDS OR THE LIKE
John P. Stelmak, 33 Hudsonview Dr., Beacon, N.Y. 12508
Filed Dec. 23, 1986, Ser. No. 945,473
Term of patent 14 years
U.S. Cl. D23—332

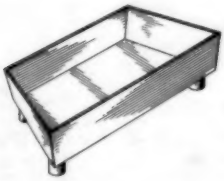


308,246
WOOD AND COAL BURNING STOVE
Duncan C. Syme, Norwich; Vance R. Smith, and Allan S. Wilker, both of Brookfield, all of Vt., assignors to Vermont Castings, Inc., Randolph, Vt.
Filed Mar. 23, 1988, Ser. No. 172,127
Term of patent 14 years
U.S. Cl. D23—346

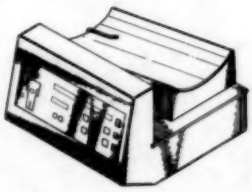
308,247
AIR CONDITIONER SUPPORT
Brian D. Adam, and Courtney L. Adam, both of Sioux City, Iowa, assignors to Bramec Corporation, North Sioux City, S. Dak.
Filed Mar. 10, 1987, Ser. No. 23,872
Term of patent 14 years
U.S. Cl. D23—354



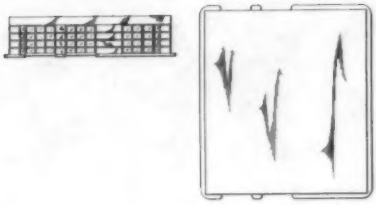
308,248
FIREPLACE INSERT FOR HOLDING MATERIAL TO BE BURNED
Frank J. Koch, Ogdensburg, N.Y., assignor to Linda Koch Beamish, Ontario, Canada
Filed Oct. 3, 1988, Ser. No. 252,445
Term of patent 14 years
U.S. Cl. D23—401



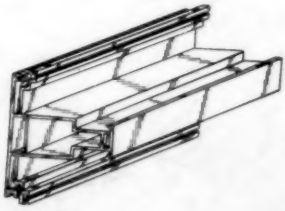
308,249
PERITONEAL DIALYSIS MACHINE
Francis D. Buckley, Freehold, N.J., assignor to Delmed, Inc., Concord, Calif.
Filed Sep. 25, 1987, Ser. No. 101,336
Term of patent 14 years
U.S. Cl. D24—8



308,250
SERVICE BUILDING AND THE LIKE
Alan E. Goldberg, New Canaan, Conn., assignor to Mobil Oil Corporation, New York, N.Y.
Filed Oct. 22, 1987, Ser. No. 111,463
Term of patent 14 years
U.S. Cl. D25—34



308,251
WINDOW COMPONENT
Terence Hardy, Nether Heage, England, assignor to L.B. Plastics Limited, England
Filed Aug. 10, 1989, Ser. No. 392,251
Term of patent 14 years
U.S. Cl. D25—124

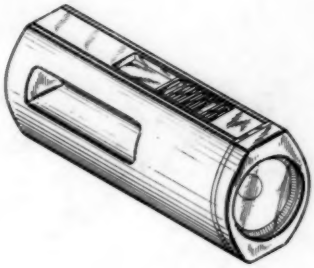


308,252
CANDLE LAMP
James R. Friese, Country Club Hills, Ill., assignor to Candle Corporation of America, Chicago, Ill.
Filed Jun. 22, 1987, Ser. No. 64,446
Term of patent 14 years
U.S. Cl. D26—11

308,253
COMBINED FLASHLIGHT AND RECHARGER THEREFOR
Eugene P. Battles, P.O. Box 429, Cascade, Id. 83611, and Clayton Battles, 6355 W. Hauser Lake Rd., Post Falls, Id. 83854
Filed Jul. 17, 1986, Ser. No. 886,324
Term of patent 14 years
U.S. Cl. D26—38

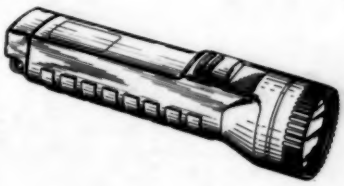
308,254
COMBINED FLASHLIGHT AND FLUORESCENT LANTERN
Keiichi Ohashi, Shizuoka, Japan, assignor to Skylite Industry Co., Ltd., Shizuoka, Japan
Filed May 19, 1987, Ser. No. 51,305
Term of patent 14 years
U.S. Cl. D26—42

308,255
LANTERN
Ronald Emmerling, New City, N.Y., assignor to International Consumer Brands, Inc., Trumbull, Conn.
Filed Oct. 23, 1987, Ser. No. 111,822
Term of patent 14 years
U.S. Cl. D26—46



308,256
PORTABLE LIGHT
Keiichi Ohashi, Shizuoka, Japan, assignor to Skylite Industry Co., Ltd., Shizuoka, Japan
Filed May 20, 1987, Ser. No. 51,607
Claims priority, application Japan, Mar. 18, 1987, 62-10185
Term of patent 14 years
U.S. Cl. D26—48

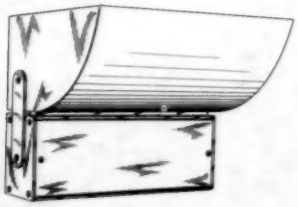
308,257
FLASHLIGHT
Robert B. Staubitz, Avon, and Frank G. Marshall, Meriden, both of Conn., assignors to The Bridgeport Metal Goods Manufacturing Company, Bridgeport, Conn.
Filed Sep. 18, 1987, Ser. No. 98,121
Term of patent 14 years
U.S. Cl. D26—49



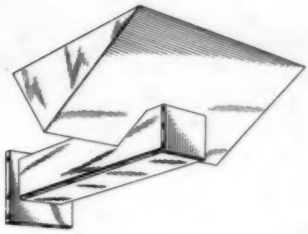
308,258
MINIATURE FLASHLIGHT
Wen Kung-kit, Montecello, and Mak K. Biu, North Point, both of Hong Kong, assignors to International Consumer Brands, Inc., Trumbull, Conn.
Filed Oct. 23, 1987, Ser. No. 111,731
Term of patent 14 years
U.S. Cl. D26—49

308,259
FLUORESCENT LIGHTING FIXTURE
Jack Burkarth, Dallas, Tex., assignor to Gulton Industries, Inc., Plano, Tex.
Filed Dec. 7, 1987, Ser. No. 129,731
Term of patent 14 years
U.S. Cl. D26—78

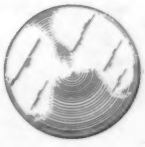
308,260
WALL MOUNTED INDIRECT LIGHTING FIXTURE
Sylvan R. Shemitz, Woodbridge, Conn., assignor to Sylvan R. Shemitz Associates, Inc., West Haven, Conn.
Filed Apr. 9, 1987, Ser. No. 36,843
Term of patent 14 years
U.S. Cl. D26—85



308,261
WALL MOUNTED INDIRECT LIGHTING FIXTURE
Sylvan R. Shemitz, Woodbridge, Conn., assignor to Sylvan R. Shemitz Associates, Inc., West Haven, Conn.
Filed Apr. 9, 1987, Ser. No. 36,842
Term of patent 14 years
U.S. Cl. D26—87



308,262
LAMP GLOBE
Ralph Flores, 5154 Garden Grove Ave., Tarzana, Calif. 91356
Filed Sep. 8, 1986, Ser. No. 905,610
Term of patent 14 years
U.S. Cl. D26—131

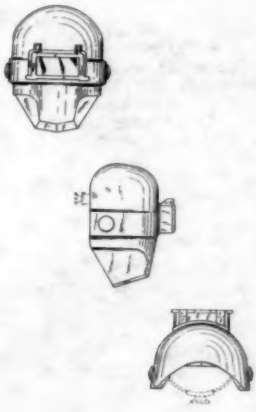


308,263
MAGNETIC TROUBLE LIGHT HOLDER
Estle A. Cook, Butler, Mo., assignor to CK Products, Inc., Butler, Mo.
Filed Apr. 15, 1987, Ser. No. 38,591
Term of patent 14 years
U.S. Cl. D26—140

308,264
LOTION APPLICATOR OR SIMILAR ARTICLE
David B. Redmann, and Lee E. A. Redmann, both of 16601 Calico Pl., Tampa, Fla. 33618
Filed Mar. 5, 1987, Ser. No. 22,344
Term of patent 14 years
U.S. Cl. D28—7

308,265
TOOTHPICK
Richard J. Shaw, Brookfield, and James A. Bojar, Wauwatosa, both of Wis., assignors to International Floss Pick Corporation, Milwaukee, Wis.
Filed Aug. 15, 1988, Ser. No. 232,370
Term of patent 14 years
U.S. Cl. D28—64

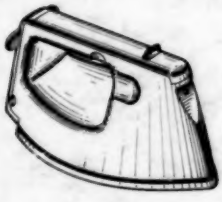
308,266
WELDING HELMET
Dennis A. Van Wyk, 1097 Calvin St., Eugene, Oreg. 97401
Filed Aug. 3, 1987, Ser. No. 80,582
Term of patent 14 years
U.S. Cl. D29—15



308,267
STORAGE RACK FOR A VACUUM CLEANER AND TOOLS
Sidney H. Bradd, Solon, Ohio, assignor to The Hoover Company, North Canton, Ohio
Filed Apr. 20, 1987, Ser. No. 40,145
Term of patent 14 years
U.S. Cl. D32—31

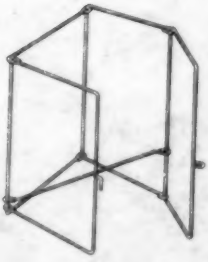
308,268
WALL HAMPER
Pamela Phelps, 30 Quentin Ave., New Brunswick, N.J. 08901, and Roberta White, 511 Algair Ave., North Brunswick, N.J. 08902
Filed May 13, 1988, Ser. No. 193,635
Term of patent 14 years
U.S. Cl. D32—37

308,269
STEAM IRON
Aldan Petrie, and Stephen Lane, both of Boston, Mass., assignors to International Consumer Brands, Inc., Trumbull, Conn.
Filed Feb. 16, 1988, Ser. No. 155,754
Term of patent 14 years
U.S. Cl. D32—70



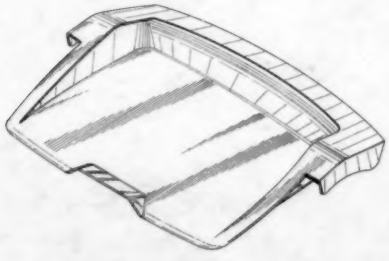
308,270
FUNNEL FOR PLASTIC BAG
Aurora Sarabia, 407 W. Longview, Stockton, Calif. 95207
Filed Sep. 23, 1988, Ser. No. 248,023
Term of patent 14 years
U.S. Cl. D34—5

308,271
FOLDABLE TRASH BAG HOLDER OR SIMILAR ARTICLE
Richard Vreeken, 25814 Northwinds Dr., Romoland, Calif. 92380
Filed Mar. 14, 1988, Ser. No. 167,436
Term of patent 14 years
U.S. Cl. D34—6

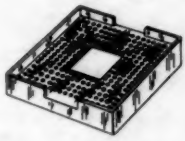


308,272
COMBINED WASTE BAG DISPENSER AND RECEPTACLE
William A. Koepsell, 16740 Greenwich Cir., Yorba Linda, Calif. 92686
Filed Oct. 17, 1988, Ser. No. 258,450
Term of patent 14 years
U.S. Cl. D34—6

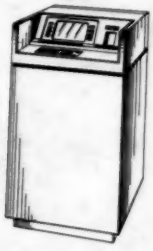
308,273
LID FOR WASTE BASKET
Thomas E. Hanna, Wooster, Ohio, assignor to Rubbermaid Incorporated, Wooster, Ohio
Filed Nov. 2, 1988, Ser. No. 266,488
Term of patent 14 years
U.S. Cl. D34—11



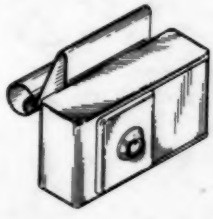
308,274
COMBINED SHIPPING AND HANDLING CARRIER
Roland Gosselin, Nashua, and Robert H. Murphy, Milford, both of N.H., assignors to R. H. Murphy Company, Co., Inc., Amherst, N.H.
Filed Jan. 7, 1987, Ser. No. 1,108
Term of patent 14 years
U.S. Cl. D34—40



308,275
AUTOMATIC TELLER MACHINE
Michael D. Garten, and Marina Naito, both of Charlotte, N.C., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed May 23, 1986, Ser. No. 867,868
Term of patent 14 years
U.S. Cl. D99—28

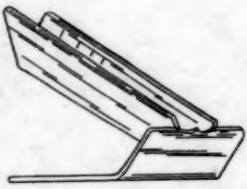


308,276
KEY SAFE FOR A VEHICLE
Paul Appelbaum, P.O. Box 27006, Denver, Colo. 80227
Filed Dec. 17, 1987, Ser. No. 134,448
Term of patent 14 years
U.S. Cl. D99—28

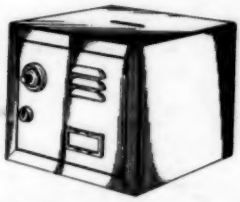


308,277
COIN COUNTER
Opal C. Walker, P.O. Box 3397, Quail Valley, Calif. 92380
Filed Apr. 7, 1986, Ser. No. 850,878
Term of patent 14 years
U.S. Cl. D99—34

308,278
COIN STACKING AND COUNTING STAND
Lewis H. Edwards, 1500 Blossom Hill Rd., Castle Shannon, Pa. 15234
Filed Jun. 15, 1987, Ser. No. 61,401
Term of patent 14 years
U.S. Cl. D99—34



308,279
CASH BOX OR SIMILAR ARTICLE
A. Fred Hill, Richardson, Tex., assignor to Fred Hill, Inc., Richardson, Tex.
Filed Nov. 23, 1987, Ser. No. 124,473
Term of patent 14 years
U.S. Cl. D99—35



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TO WHOM

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NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

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Akanuma, Hideo; Murata, Masashi; Inoue, Kiyoshi; and Ohgake, Ryoji, to Asahi Glass Co., Ltd.; and Nippon Oil Co., Ltd., a part interest. Lubricating oil compositions for chains. 4,929,372, Cl. 252-29.000.

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Antranikian, Garabed; and Gottschalk, Gerhard, to Kali-Chemie AG. Thermostable amylases and pullulanases from two anaerobic microorganisms. 4,929,557, Cl. 435-202.000.
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Aoki, Akio, to Trion Corporation. Baseball catching apparatus. 4,928,320, Cl. 2-19.000.
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Aoki, Ikumi: *See*—
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Morigaki, Masakazu; and Aoki, Kozo, 4,929,538, Cl. 430-551.000.
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Kitayama, Shinichiro; Adachi, Teruho; Ueda, Masahiro; Aoki, Yuichi; Shiiki, Satoshi; Takigawa, Akio; Yoshida, Motoaki; Imamura, Naoya; Maeda, Koichi; and Kayanoki, Hisayuki, 4,929,523, Cl. 430-4.000.
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Appavoo, Darma L. Splash guard. 4,928,993, Cl. 280-851.000.
Apple, Phillip C., to American Holtzkraft, Inc. Umbrella. 4,928,718, Cl. 135-22.000.
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Apsley Metals Limited: *See*—
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Ara, Kouichi, to NEC Home Electronics Ltd. Circuit for generating image signal. 4,929,937, Cl. 340-728.000.
Arai, Yasuhisa: *See*—
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Shekleton, Jack R.; Rodgers, Colin; and Archibald, John P., 4,928,479, Cl. 60-39.360.
Arco Chemical Technology, Inc.: *See*—
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Arena Recreations (Toronto) Limited: *See*—
Granzotto, Robert; and Wong, Wah K. J., 4,928,905, Cl. 242-201.000.
Arft, Dennis E., to Leggett & Platt, Incorporated. Adjustable seat pitch sofa sleeper mechanism. 4,928,331, Cl. 5-13.000.
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Arimoto, Akira; Ishikawa, Sachiko; and Kataoka, Keiji, to Hitachi, Ltd. Optical pickup using waveguide. 4,929,044, Cl. 350-96.130.
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Armstrong, Ralph: *See*—
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Asahi Kasei Kogyo Kabushiki Kaisha: *See*—
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Ashley, Carol S.; and Reed, Scott T., to United States of America, Energy. Sol-gel antireflective coating on plastics. 4,929,278, Cl. 106-287.120.
Aslam, Mohammad; Vicari, Richard; and Davenport, Kenneth G., to Hoechst Celanese Corporation. Copolymers of p-mercaptostyrene and its esters. 4,929,694, Cl. 526-262.000.
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Bauer, Thomas M.; Dunn, Thomas A.; Gurke, Christina M.; Hopkins, John W.; and Nafziger, Richard D., 4,930,154, Cl. 379-246.000.
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Atkinson, Robert W.; Crayton, John W.; Portscheller, James I.; and Wood, Daniel C., to Caterpillar Inc. Automatic starting fluid injection apparatus and method. 4,928,642, Cl. 123-180.00R.
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Atlantic Richfield Company: *See*—
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Kyle, Donald G., 4,930,109, Cl. 367-27.000.
Lara, Pedro F., 4,929,896, Cl. 324-240.000.
Siegfried, Robert W., II, 4,928,758, Cl. 166-66.000.
Siegfried, Robert W., II; Smith, Lonnie J.; and Cornette, H. Mitchell, 4,928,759, Cl. 166-65.100.
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Atwell, William H.; Burns, Gary T.; and Saha, Chandan K., to Dow Corning Corporation. Highly densified bodies from organopolysiloxanes filled with silicon carbide powders. 4,929,573, Cl. 501-90.000.
Audi AG: *See*—
Schaper, Siegfried; and Seufert, Martin, 4,929,315, Cl. 204-18.100.
Audren, Yves; and Tuffal, Guy, to Isover Saint-Gobain. Compression coiling machine. 4,928,898, Cl. 242-55.100.
Audsley, Edwin F. Process for forming multi-layer flexible molds. 4,929,403, Cl. 264-22.000.
Auerbach, David R., to Pitney Bowes Inc. Method and apparatus for turning flat articles. 4,928,807, Cl. 198-379.000.
Aufdembrink, Brent A.; and Landis, Michael E., to Mobil Oil Corporation. Method for intercalating organic-swelled layered metal chalcogenide with polymer chalcogenide by treatment with polymeric chalcogenide precursor in inert atmosphere. 4,929,587, Cl. 502-242.000.
Ausiello, Francesco Paolo, to Weber S.r.l. Fuel-injection pump with variable cylinder capacity for diesel engine injection systems. 4,928,656, Cl. 123-504.000.
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Ausnit, Steven; and Boeckmann, Hugo, to Minigrip, Inc. Method of making bags and bag material having hinged zipper strips. 4,929,225, Cl. 493-213.000.
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Lotz, Horst K.; and Thomma, Gunther, 4,928,932, Cl. 266-58.000.
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Koller, Floyd G., 4,928,731, Cl. 137-599.000.
Automated Packaging Systems, Inc.: *See*—
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Seidman, Sheldon, 4,928,367, Cl. 24-705.000.
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Lecocq, Jean-Luc, 4,929,941, Cl. 340-825.140.
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Lecocq, Jean-Luc, 4,929,941, Cl. 340-825.140.
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AVL Gesellschaft fur Verbrennungskraftmaschinen und Messtechnik m.b.H. Prof. Dr.Dr.h.c. Hans List: *See*—
Muhrer, Gerhard; Pannold, Reinhard; and Boschanig, Reinhard, 4,928,523, Cl. 73-167.000.
Avni, Eitan; Salama, Simon; and Turi, Eran, to Union Camp Corporation. Method of making high quality extrusion coated paper for quality printing. 4,929,474, Cl. 427-326.000.
Awano, Hikaru; Asai, Seiichi; Kaneko, Katsuo; Kaida, Hiroshi; and Yoshida, Fujio, to Cashew Company, Ltd. Coating gun. 4,928,882, Cl. 239-112.000.
Axelson, Scott R.: *See*—
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Azionaria Costruzioni Macchine Automatiche A.C.M.A. S.p.A.: *See*—
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B. Braun Melsungen AG: *See*—
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Babbitt, William R.; Beausoleil, Raymond G.; and Leep, David A., to Boeing Company, The. Multiple laser frequency stabilization. 4,930,133, Cl. 372-32.000.
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Kotaka, Ikuo, 4,928,753, Cl. 165-104.270.
Bachelder, Walter F.; Sullivan, John L.; Fiore, Peter J.; and Hansen, Godfrey L., to Testing Machines Inc. Burst testing apparatus. 4,928,533, Cl. 73-838.000.
Bachem, Henning; Suling, Carlhans; Muszik, Janos; and Schroer, Wolf-Dieter, to Bayer Aktiengesellschaft. Nitrogen-containing water-soluble polymeric compounds. 4,929,309, Cl. 162-164.300.
Bachomoff, Guy R.: *See*—
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Bae, Myung H., to Samsung Semiconductor & Telecommunications Co. TTL to CMOS input buffer circuit. 4,929,852, Cl. 307-475.000.
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Baggio, Giorgio; Gonella, Mario; and Sartor, Mariano, to NORDICA S.P.A. Ski boot with improved wearability. 4,928,408, Cl. 36-119.000.
Bagley, Brian G.; and Tarascon, Jean-Marie, to Bell Communications Research, Inc. Oxygen plasma treatment of yttrium barium copper oxide. 4,929,598, Cl. 505-1.000.
Bahl, Surinder K.; Canterino, Peter J.; Cunningham, Theresa L.; Evans, Susan P.; and Shaw, Richard G., to Mobil Oil Corporation. Blends of LLDPE, polypropylene and aromatic polymers and high modulus films thereof. 4,929,681, Cl. 525-240.000.
Bains, Kuldip S., to General DataCom, Inc. Multiplexer frame synchronization technique. 4,930,125, Cl. 370-105.000.
Baker, Gerald N., to Emerson Electric Co. Belt locator for locating a belt on a pulley. 4,929,219, Cl. 474-102.000.
Baker Hughes Incorporated: *See*—
Hopmann, Mark E., 4,928,772, Cl. 166-386.000.
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Peterson, Elmer R., 4,928,768, Cl. 166-380.000.
Vandevier, Joseph E., 4,928,771, Cl. 166-385.000.
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Baker, John B. Rack loader. 4,929,140, Cl. 414-267.000.
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Balazar, Leonard, to Hewlett-Packard Company. Ink delivery system for ink'jet printer. 4,929,963, Cl. 346-1.100.
Baldwin, Chris J., to Sperry Marine, Inc. Marine compass rate-of-turn indicator. 4,929,943, Cl. 340-984.000.
Baldwin, John J.; Ponticello, Gerald S.; and Habecker, Charles N., to Merck & Co., Inc. Substituted thiophene-2-sulfonamide antiglaucoma agents. 4,929,637, Cl. 514-445.000.
Ballet, Jean-Noel, to ECIA - Equipements et Composants pour l'Industrie Automobile. Simplified and improved safety-belt buckle. 4,928,366, Cl. 24-641.000.
Ballway, John A. Combination drinking vessel and cup holder with convertible cap/coaster. 4,928,848, Cl. 220-444.000.
Balon, John, Jr.; and Egan, Richard J. Down draft re-circulating system. 4,929,262, Cl. 55-341.200.
Balson-Hercules Group Ltd., The: *See*—
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Ban, Kazuki; and Oyabu, Norio, to Asahi Kasei Kogyo Kabushiki Kaisha. Urethane prepolymer composition and a polyurethane coating composition system. 4,929,667, Cl. 524-718.000.
Bang, Kook B. Power driven screw driver. 4,928,560, Cl. 81-463.000.
Bangerger, Timothy W. Sealed bearing lubricator. 4,928,794, Cl. 184-5.100.
Bannai, Hiroyuki; Ida, Yuichi; and Kato, Hironori, to Alps Electric Co., Ltd. Cable reel. 4,928,901, Cl. 242-85.000.
Banner, Michael J.: *See*—
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Banzi, Viviano; and Fabri, Roberto, to Ausimont S.p.A. Process for crafting maleic anhydride on olefinic polymers. 4,929,682, Cl. 525-257.000.
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Barasch, Stephen T. Hypodermic needle sheath protection shield apparatus. 4,928,824, Cl. 206-365.000.
Barbelet, Barry D. Seating structure with displaceable water bladder. 4,929,026, Cl. 257-454.000.
Barber, Lois M., to LMB Hand Rehab Products. Hygiene splint. 4,928,677, Cl. 128-87.00R.
Barder, Timothy J., to UOP. Separation of 2,7 diisopropylnaphthalene from a feed mixture comprising various diisopropylnaphthalene isomers with a zeolite adsorbent. 4,929,796, Cl. 585-828.000.

Barer, Sol J.; Maxwell, Peter C.; and Hsieh, Jih-Han, to Celgene Corporation. Production of hexamethylenediamine muconate salt. 4,929,396, Cl. 562-595.000.

Barlics, Glen D.: *See—*
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Barlics, John J.; and Barlics, Glen D., to Inman Mold Manufacturing Co., Inc. Air freshener. 4,928,881, Cl. 239-44.000.

Barlow, Gordon A., to Gordon Barlow Design. Latch & latch release mechanism for a game. 4,928,960, Cl. 273-1.0GG.

Barlow, Robert W. Remateable fiber optic splice. 4,929,046, Cl. 350-96.210.

Barnes Group Inc.: *See—*
Smith, Donald A.; Carter, William H.; Dingfelder, Howard E.; Burgess, Dale L.; and Gates, Alan B., 4,928,378, Cl. 29-564.600.

Barnes, Michael W., to Thiokol Corporation. Propellant containing 2-hydroxymethyl-1,3-propanediol trinitrate. 4,929,291, Cl. 149-19.400.

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Barnsby, Roger M.: *See—*
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Barrington, Burchus Q., to Halliburton Company. Plug release indicator. 4,928,520, Cl. 73-151.000.

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Barshay, Stanley F.; and Mayer, Peter, to American Home Products Corporation. Tamper proof encapsulated medicaments. 4,928,840, Cl. 220-8.000.

Bartczak, Andrzej; and Cetnar, Roman, to Magna International Inc. Latch mechanism. 4,929,007, Cl. 292-336.300.

Bartley, David W., to Ohio Gratings, Inc. Grating construction. 4,928,471, Cl. 52-664.000.

Bartolucci, Raymond A., to American Cyanamid Company. Unit dosage form. 4,929,446, Cl. 424-439.000.

Barton, Arthur A.; DeBolt, Frederick C.; Elter, Michael R.; Fromm, Paul M.; Grossi, Frank A.; Miller, Mark T.; Rasch, Kenneth R.; and Szlucha, Thomas F., to Xerox Corporation. Stripper mechanism. 4,929,983, Cl. 355-315.000.

Barzuza, Ytzhak, to Filtration L.T.D. Method for filtering a fluid. 4,929,363, Cl. 210-741.000.

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Goertz, Hans-Helmut; Denzinger, Walter; and Raubenheimer, Hans-Juergen, 4,929,690, Cl. 525-366.000.
Hansen, Guenter; Schefczik, Ernst; and Reichelt, Helmut, 4,929,720, Cl. 534-766.000.
Hesse, Michael; Hoelderich, Wolfgang; and Schwarzmann, Matthias, 4,929,733, Cl. 546-184.000.
Himmele, Walter; Bott, Kaspar; and Bronstert, Klaus, 4,929,786, Cl. 585-469.000.
Lechtken, Peter; and Kutschera, Peter, 4,929,249, Cl. 8-464.000.
Leyendecker, Joachim; Buerstinghaus, Rainer; Theobald, Hans; Kuenast, Christoph; and Hofmeister, Peter, 4,929,617, Cl. 514-252.000.
Smuda, Hubert; Hoelderich, Wolfgang; Goetz, Norbert; and Recker, Hans-Gert, 4,929,765, Cl. 568-427.000.
Taglieber, Volker; Hoelderich, Wolfgang; Kummer, Rudolf; Mross, Wolf D.; and Saladin, Guenter, 4,929,758, Cl. 564-485.000.
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Basics Corporation: *See—*
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Basse, Hartwig, to Norddeutsche Seekabelwerke AG. Filling material for percolating filters for the treatment of liquids and process for producing and assembling it. 4,929,484, Cl. 428-53.000.

Bassett, C. Andrew L.; and Cook, Ian A., to Osteo-Dyne, Inc. Method and device for providing active exercise treatment for a patient suffering from a bone disorder. 4,928,959, Cl. 272-96.000.

Batcho, Andrew D.; Horst, Ronald L.; and Uskokovic, Milan R., to Hoffmann-La Roche Inc.; and United States of America, Agriculture. 25, 28-dihydroxyergocalciferol and 1,25,28-trihydroxyergocalciferol compositions thereof and their use in the treatment of hyperproliferative disease. 4,929,609, Cl. 514-167.000.

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Batman, Eric S.: *See—*
Matthews, Charles W.; Batman, Eric S.; and King, Jeffrey F., 4,929,770, Cl. 568-756.000.

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Kordesch, Karl; and Harer, Wilhelm, 4,929,520, Cl. 429-94.000.

Bauer, John K. Steering system for tracking of wheels. 4,928,984, Cl. 280-95.100.

Bauer, Theodor, to Daimler-Benz AG. Convertible top for vehicles, particulary for motor cars. 4,929,015, Cl. 296-116.000.

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Bauerfeind GmbH & Co.: *See—*
Scheuermann, Rainer, 4,928,404, Cl. 36-37.000.

Bauerle, David D., to Colt Industries Inc. Adjustable air cleaner fastening assembly. 4,929,260, Cl. 55-510.000.

Baum, Thomas M., to Coeur Laboratories, Inc. Multi-pressure injector device. 4,929,238, Cl. 604-208.000.

Baumann, Marcus: *See—*
Moser, Hans; Pissiotas, Georg; Brunner, Hans-Georg; Bohner, Beat; and Baumann, Marcus, 4,929,272, Cl. 71-95.000.

Baumoel, Joseph. Fluoroether grease acoustic couplant. 4,929,368, Cl. 252-11.000.

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Desecki, Vince C.; and Prisco, Michael R., 4,929,242, Cl. 604-266.000.

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Bachem, Henning; Suling, Carlhans; Muszik, Janos; and Schroer, Wolf-Dieter, 4,929,309, Cl. 162-164.300.
Dedden, Hubert; Gieger, Eckhard; and Lauer, Christian, 4,929,829, Cl. 250-208.400.
Dujardin, Ralf; Meyer, Rolf-Volker; and Siebourg, Wolfgang, 4,929,709, Cl. 528-198.000.
Engbert, Theodor; Frohlich, Jurg; Kubitza, Werner; Breidenbach, Peter; and Mennicken, Gerhard, 4,929,724, Cl. 540-202.000.
Forster, Heinz; Beck, Gunther; Klauke, Erich; Santel, Hans-Joachim; and Schmidt, Robert R., 4,929,743, Cl. 548-187.000.
Herd, Karl-Josef, 4,929,757, Cl. 564-423.000.
Jelich, Klaus; Brandes, Wilhelm; Hanssler, Gerd; and Reinecke, Paul, 4,929,738, Cl. 549-76.000.
Klinkmann, Kurt; Herzhoff, Michael; and Burmeister, Gerhard, 4,929,784, Cl. 585-422.000.
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Mazanek, Jan; von Gizycki, Ulrich; Muller, Hanns P.; Wienkenhover, Martin; Wieser, Karl-Heinz; Paulat, Volker; Theuer, Werner; and Muller, Walter, 4,929,705, Cl. 528-49.000.
Meurer, Kurt P.; Waniczek, Helmut; Sylvester, Gerd; and Witte, Josef, 4,929,689, Cl. 525-333.900.
Mohrs, Klaus; Raddatz, Siegfried; Fruchtmann, Romanis; Kohlsdorfer, Christian; and Muller-Peddinghaus, Reiner, 4,929,626, Cl. 514-311.000.
Nouvertne, Werner; Gielen, Franz-Josef; Tacke, Peter; Grigo, Ulrich; Quiring, Bernd; and Lindner, Christian, 4,929,674, Cl. 325-66.000.
Reiser, Wolf; and Feyen, Peter, 4,929,735, Cl. 548-268.800.
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Scholl, Thomas; Jabs, Gert; and Richartz, Adolf, 4,929,710, Cl. 528-205.000.

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Possani, Lourival D. P.; Gurrola, Georgina B.; Bayon, Marco A. A. C.; and Sitges, Maria B., 4,929,718, Cl. 530-326.000.

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Beam, Jerry E.: *See—*
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Chan, C. S.; Bearss, James G.; and Nelson, Terry M., 4,930,018, Cl. 358-298.000.

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Babbitt, William R.; Beausoleil, Raymond G.; and Leep, David A., 4,930,133, Cl. 372-32.000.

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Beckman, William J. Bio-filtration apparatus and method for wastewater treatment. 4,929,349, Cl. 210-151.000.

Beckmann, Robert C.: *See*—
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Bedard, Michel: *See*—
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Beechko, Nicholas, to International Business Machines Corporation. Anisotropic etching method and etchant. 4,929,301, Cl. 156-657.000.

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Beghelli, Gian Pietro. Connection and fixing system for electronic unit. 4,929,192, Cl. 439-534.000.

Begout, Eric; Bourgeois, Alain; Gueuret, Raymond; and Lapeyre, Pascal, to Societe Anonyme dite: Alcatel Thomson Faisceaux Hertziens. Feed horn for a telecommunications antenna. 4,929,962, Cl. 343-786.000.

Beige, Joel, to Rubie's Costume Co. Illuminable jewelry item. 4,930,052, Cl. 362-104.000.

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Belko, William R., Jr. Spring tension holding means. 4,928,821, Cl. 206-329.000.

Bell Communications Research, Inc.: *See*—
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Miller, Patrick A., 4,930,152, Cl. 379-214.000.

Bell, Dennis E., to Landoll Corporation. Cultivator with improved disc positioning means. 4,928,774, Cl. 172-430.000.

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Svyatsky, Eduard; Loftis, Jerry W.; and Faber, Thomas, 4,928,946, Cl. 271-10.000.
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Bell, James A.: *See*—
Tyers, Michael B.; Coates, Jan H.; Humber, David C.; Ewan, George B.; and Bell, James A., 4,929,632, Cl. 514-397.000.

Bell, Michael G.; and Stevens, Robert L. Locator and clamping means for a jug fixture. 4,928,939, Cl. 269-309.000.

Bell Microsensors, Inc.: *See*—
Bell, Robert L.; and Renger, Herman L., 4,929,890, Cl. 324-78.00R.

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Watson, Keith G.; Drygala, Peter; and Bell, Stephen, 4,929,269, Cl. 71-92.000.

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Toon, Donald A.; and Belshaw, Douglas J., 4,928,541, Cl. 73-864.630.

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Conaghan, Thomas B.; Gladfelter, Harry F.; Kite, Joseph S., III; and Tresslar, Marie C., 4,929,478, Cl. 428-35.100.

Berg, Larry; Wright, Ricky A.; and Caswell, Philip A. Sports board. 4,929,110, Cl. 402-73.000.

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Bergner, Arndt, to Hilti Aktiengesellschaft. Expansion dowel assembly. 4,929,134, Cl. 411-30.000.

Berkel, Werner, to Hewlett-Packard Company. Output amplifier. 4,929,907, Cl. 330-252.000.

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Bernstein, Leon M., to Kurt Manufacturing Company, Inc. Multi-purpose machine vise. 4,928,937, Cl. 269-136.000.

Bertolotti, Luigi, to Bertolotti S.p.A.; and Nuova Italsider S.p.A. Process for wrapping ribbon type metal coils. 4,928,454, Cl. 53-409.000.

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Besmann, Theodore M.; and Lowden, Richard A., to Martin Marietta Energy Systems, Inc. Titanium diboride ceramic fiber composites for Hall-Heroult cells. 4,929,328, Cl. 204-279.000.

Beta Raven, Inc.: *See*—
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Betz Laboratories, Inc.: *See*—
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Chen, Fu; and Carey, William S., 4,929,695, Cl. 526-297.000.
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Fukamachi, Chiharu; Schumacher, Horst; Bewert, Wolfgang; and Schneider, Joachim, 4,929,774, Cl. 568-824.000.

Beyrich, Jurgen: *See*—
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BF Goodrich Company, The: *See*—
Kletecka, George; Lai, John T.; and Son, Pyong N., 4,929,653, Cl. 524-96.000.

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Pickering, John H.; Bhatia, Sushil K.; Rath, Mihira K.; and Chevrette, Roger N., 4,928,995, Cl. 281-29.000.

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Billmers, Robert L.; Del Giudice, David M.; Tessler, Martin M.; and Hasuly, Michael J., to National Starch and Chemical Investment Holding Corporation. Polysaccharides containing aromatic aldehydes and their derivatization via amine-aldehyde interactions. 4,929,670, Cl. 525-54.100.

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Abaziou, Jean-Luc; Billy, Jean-Claude; and Le Mouel, Bernard, 4,930,127, Cl. 370-110.400.

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Binder, Dieter; and Rovensky, Franz, to Chemisch Pharmazeutische Forschungsgesellschaft. Novel basic-substituted 5-halo-thienoisothiazol-3(2H)-one 1,1-dioxides, a process for the preparation thereof, and pharmaceutical preparations containing these compounds. 4,929,616, Cl. 514-253.000.

Binish, Patrick W.: *See*—
Clark, Robert J.; and Binish, Patrick W., 4,929,014, Cl. 296-97.800.

Biologix, Inc.: *See*—
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Biomedical Devices Company, Inc.: *See*—
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Bird, Philip H.; Coe, David J.; Paxman, David H.; and Korteling, Aart G., to U.S. Philips Corp. High voltage semiconductor with integrated low voltage circuitry. 4,929,884, Cl. 323-313.000.

Bitzel, Michael E.: *See*—
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Elson, Donald E.; Gerke, Burton E., Jr.; Bitzel, Michael E.; Wilder, Bruce A.; Rodowsky, Stanley J., Jr.; Lessig, William R., III; Adams, Jeffrey S.; and Hagan, Todd A., 4,928,346, Cl. 15-338.000.
Krasznai, Charles Z.; and Kosten, Richard B., 4,928,347, Cl. 15-344.000.

Blackman, Steven T., to Thames Pharmacal Co., Inc. Anti-infective methods and compositions. 4,929,619, Cl. 514-263.000.

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Freeman, Anthony; Blacknell, David; Quegan, Shaun; Ward, Ian A.; Oliver, Christopher J.; Finley, Ian P.; White, Richard G.; and Wood, James W., 4,929,950, Cl. 342-25.000.

Blanchard, Richard A., to Siliconix Incorporated. Rugged lateral DMOS transistor structure. 4,929,991, Cl. 357-23.800.

Blanken, Pieter G., to U.S. Philips Corporation. Current mirror circuit, and video output amplifier circuit provided with the current mirror circuit. 4,929,912, Cl. 330-288.000.

Blankenship, George D., to Lincoln Electric Company, The. Plasma arc torch interlock with disabling control arrangement system. 4,929,811, Cl. 219-121.540.

Blenkush, Brian J.: *See*—
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Bliss, William R. Electrically heated wiper blade utilizing fibrous carbon heating element. 4,928,344, Cl. 15-250.060.

Bloemendal, Berend J.; and Broenhaar, Marinus J. G., to Persluchtring Advies B.V. Fluid pressure operated push beam and apparatus comprising one or more of such push beams. 4,928,926, Cl. 254-93.00R.

Blome GmbH & Co. Kommanditgesellschaft, and Strabag Bau-Aktiengesellschaft: *See*—
Blome, Peter, 4,929,294, Cl. 156-187.000.

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Blum, Jerome V., to Visual Ease, Inc. Eye comfort panel. 4,929,865, Cl. 313-478.000.

Board of Regents, The University of Texas System: *See*—
Brewer, Cecil C., 4,928,830, Cl. 206-570.000.
Munford. Robert S.; and Hall, Catherine L., 4,929,604, Cl. 514-53.000.

Bodai, Balazs I.; Grandon, Michael D.; Gilbert, Scott J.; Littlejohn, Douglas J.; Lemons, Kyle E.; Fellows, Richard L.; Barry, Michael

R.; and Delapp, Michael D., to Biologix, Inc. Portable blood chemistry measuring apparatus. 4,929,426, Cl. 422-63.000.
Bode, Jurgen: *See—*
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Bodine, David B.; and Farkas, Joseph R. Alarm system. 4,929,925, Cl. 340-426.000.
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Boehm, Manfred D.: *See—*
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Boehringer Ingelheim KG: *See—*
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Boehringer Mannheim Corporation: *See—*
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Watts, Robert M., 4,928,904, Cl. 242-158.00R.
Weixelman, Lawrence M.; and Swanson, Richard D., 4,929,899, Cl. 324-253.000.
Bogatin, Yakov, to SPS Technologies, Inc. Magnetic alloy compositions and permanent magnets. 4,929,275, Cl. 75-246.000.
Boghean, Barry J.; Subbanna, Somanahalli N.; Redmon, Charles L.; and Wamser, Christian A., to Allied-Signal Inc. Manufacture of high purity low arsenic anhydrous hydrogen fluoride. 4,929,435, Cl. 423-484.000.
Bohm, Georg G. A.: *See—*
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Bohman, Carl E.; and Seymour, Shaun A., to Ford New Holland, Inc. Moisture sensing apparatus with movable probe in combination with an agricultural baler having a pickup. 4,929,904, Cl. 324-696.000.
Bohner, Beat: *See—*
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Bohnert, Klaus; Kaufmann, Meinolph; and Nehring, Jurgen, to Asea Brown Boveri AG. Fiber-optic electric field sensor with piezoelectric body sensor. 4,929,830, Cl. 250-227.140.
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Bollfrass, Charles A.: *See—*
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Bonnefous, Odile M. A., to U.S. Philips Corporation. Device for measuring the speed of moving organs and blood flows by correlation. 4,928,698, Cl. 128-661.090.
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Borel, Georg, to Hermann Wangner GmbH & Co. KG. Fabric for the sheet forming section of a papermaking machine. 4,928,737, Cl. 139-383.00A.
Borges, Robert J. Corrosion and abrasion resistant alloy. 4,929,288, Cl. 148-326.000.
Borisoff, Boris: *See—*
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Borisoff, David J.; and Borisoff, Boris. Apparatus and method for stabilizing a tremolo on a musical instrument such as a guitar. 4,928,564, Cl. 84-313.000.
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Boskovic, Borislav. Ejector blade. 4,929,170, Cl. 425-556.000.
Bossenmaier, Alban, to Dasmler-Benz AG. Safety arrangement for proving the unauthorized opening of a housing. 4,929,137, Cl. 411-501.000.
Bostick, Charles R. Foldable rubber stamp handle. 4,928,594, Cl. 101-405.000.
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Botzman, Thomas J.: *See—*
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Bouchard, Andre C., to GTE Products Corporation. Glow discharge lamp containing nitrogen. 4,929,868, Cl. 313-619.000.
Bouchard, John G. Elliptical ram air pressurized airfoil parachute. 4,928,909, Cl. 244-145.000.
Boudewijns, Arnoldus J. J., to U.S. Philips Corp. Integrated circuit having plural capacitances of different values. 4,929,998, Cl. 357-45.000.
Boudreau/Darque, Inc.: *See—*
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Boudreau, Louis H., to Boudreau/Darque, Inc. Golf cup advertising device and method. 4,928,417, Cl. 40-642.000.
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Bowe, Donald J.: *See—*
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Bowen, Gerald K.; and Zagrodnik, Jeffrey P., to Globe-Union Inc. Removable protective electrode in a bipolar battery. 4,929,325, Cl. 204-268.000.
Bowes, William A., to Eastman Kodak Company. Printer and stand assembly. 4,928,918, Cl. 248-688.000.
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Bozza, Ireneo. Device for transferring articles from a first to a second conveyor with predetermined rotation of the articles during the said transfer. 4,928,809, Cl. 198-408.000.
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Bradbury, Harold M.; Pfenning, Dwight B.; Corlett, William R.; and Mays, Roscoe, Jr., to Rainbarrel Corporation. Method and apparatus for vending a containerized product on multiple occasions following at least one refill of the container with the product. 4,929,818, Cl. 235-381.000.
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Brammer, Hartmut: *See—*
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Brandener, Louis, to Societe Jacques DuBois. Flexible exhaust coupling. 4,928,998, Cl. 285-49.000.
Brandes, Wilhelm: *See—*
Jelich, Klaus; Brandes, Wilhelm; Hanssler, Gerd; and Reinecke, Paul, 4,929,738, Cl. 549-76.000.
Lindner, Werner; Becker, Benedikt; Steffens, Robert; Wachendorff-Neumann, Ulrike; Brandes, Wilhelm; Stendel, Wilhelm; and Dutzmann, Stefan, 4,929,642, Cl. 514-510.000.
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Brandt, Arlan J.: *See—*
Heilman, Marlin S.; Brandt, Arlan J.; Bowling, Larry D.; and Russial, Joseph F., 4,928,690, Cl. 128-421.000.
Brandt, Robert O., Jr. Force multiplying membrane instrument. 4,928,529, Cl. 73-726.000.
Branovich, Louis E.; Smith, ernard; Freeman, Gerard L.; and Eckart Donald W., to United States of America, Army. Method of making a cathode from tungsten powder. 4,929,418, Cl. 419-19.000.
Braschel, Volker; and Seitz, Dieter, to Robert Bosch GmbH. Anti-locking brake control system. 4,929,034, Cl. 303-103.000.
Braun, Karl, to Aesculap-Werke AG vormals Jetter & Scheerer. Device for filling the magazine of a scalp clip applicator with C-shaped scalp clips. 4,929,239, Cl. 606-142.000.
Breault, Richard D.: *See—*
Luoma, Warren L.; Martin, Ronald G.; and Breault, Richard D., 4,929,517, Cl. 429-34.000.
Breidenbach, Dieter; Oldengott, Hans; and Vitt, Burckard, to Ruhrkohle AG. Roof structure. 4,929,179, Cl. 432-247.000.
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Engbert, Theodor; Frohlich, Jurg; Kubitza, Werner; Breidenbach, Peter; and Mennicken, Gerhard, 4,929,724, Cl. 540-202.000.
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Breivik, A. Norris: *See—*
Reigstad, Gordon H.; Breivik, A. Norris; and Reigstad, Hanley S., 4,928,451, Cl. 52-223.00L.

Bremner, Douglas L.; Crews, Gary A.; and Musser, James A., to Atlantic Richfield Company. Method for conducting three-dimensional subsurface seismic surveys. 4,930,110, Cl. 367-56.000.

Breuning, Kurt. Device for feeding rodlike workpieces. 4,929,138, Cl. 414-16.000.

Breuninger, Robert K., to Texas Instruments Incorporated. Metastable resistant flip-flop. 4,929,850, Cl. 307-272.100.

Brewer, Cecil C., to Board of Regents, The University of Texas System. Suctioning supply kit. 4,928,830, Cl. 206-570.000.

Bricker, Jeffery C.: *See—*
Pollastrini, Sheila; Bricker, Jeffery C.; and Frame, Robert R., 4,929,340, Cl. 208-189.000.

Bridges, Mark E.; and Easterly, Robert W., to Eastman Kodak Company. Light bulb socket soft start and power interrupt assembly. 4,929,872, Cl. 315-209.00R.

Bridgestone Corporation: *See—*
Mizuno, Keiichiro; Iida, Kazuyoshi; and Murakami, Kazutomo, 4,929,874, Cl. 318-128.000.

Bridgestone/Firestone, Inc.: *See—*
Roland, Charles M.; Bohm, Georg G. A.; and Schonfeld, Steven E., 4,929,684, Cl. 525-274.000.

Bright, Alfred N., to Saunders-Roe Development Limited. Self luminous characters and signs incorporating same. 4,928,414, Cl. 40-551.000.

Brigolle, Roger, to Societe Anonyme des Machines Osborn. Method for applying vibrations to a resilient support and apparatus for putting this method into practice. 4,929,087, Cl. 366-111.000.

Brillhart, Donald D. Fuel. 4,929,252, Cl. 44-53.000.

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Carruthers; Alec R., 4,928,866, Cl. 225-106.000.

British Telecommunications public limited company: *See—*
Leaning, Anthony R., 4,930,013, Cl. 358-133.000.

Brock, Norbert: *See—*
Scheffler, Gerhard; Niemeyer, Ulf; Brock, Norbert; and Pohl, Jorg, 4,929,607, Cl. 514-110.000.

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Brode, George L., II: *See—*
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Brodman, Bruce: *See—*
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Bromhaar, Marinus J. G.: *See—*
Bloemendal, Berend J.; and Bromhaar, Marinus J. G., 4,928,926, Cl. 254-93.00R.

Bronstert, Klaus: *See—*
Himmele, Walter; Bott, Kaspar; and Bronstert, Klaus, 4,929,786, Cl. 585-469.000.

Brother Kogyo Kabushiki Kaisha: *See—*
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Hirayama, Takanobu; Funahashi, Hiroyuki; Yokota, Eiji; Uehara, Mitsuyoshi; Kagami, Isao; Hasegawa, Makoto; and Mizuno, Masaru, 4,929,105, Cl. 400-625.000.
Ogawa, Yoshitake, 4,928,611, Cl. 112-217.000.
Yokoi, Takeshi; and Okamori, Shuhei, 4,929,104, Cl. 400-605.000.

Brown, James. Paper clip. 4,928,361, Cl. 24-67.900.

Brown, Lawrence H., to Accu-Ring Jaw Systems, Inc. Jaw locking means for chucks. 4,928,981, Cl. 279-1.0SJ.

Brown, Paul: *See—*
DiSimone, John; Brown, Paul; and Huntington, Christopher, 4,929,166, Cl. 425-190.000.

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Brun, Gerard; Marin-Ayral, Rose-Marie; Maurin, Maurice; Pistoulet, Bernard; and Tedenac, Jean-Claude, to Centre National de la Recherche Scientifique. Silver, thallium, copper and tellurium-based thermoelectrical semiconductive thermoelectric material, preparation and application to thermoelectric converters. 4,929,282, Cl. 136-239.000.

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Brunner, Hans-Georg: *See—*
Moser, Hans; Pissiotas, Georg; Brunner, Hans-Georg; Bohner, Beat; and Baumann, Marcus, 4,929,272, Cl. 71-95.000.

Brunner, Timothy A., to Xerox Corporation. Focus and overlay characterization and optimization for photolithographic exposure. 4,929,083, Cl. 356-400.000.

Brunswick Corporation: *See—*
Weed, Lyle E., 4,928,636, Cl. 123-73.00R.

Bruscino, Joseph A.: *See—*
Moorman, Charles T.; Sabadics, Joseph L.; and Bruscino, Joseph A., 4,929,462, Cl. 426-478.000.

Bryant, David R.: *See—*
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Buan, Danilo P.; Abellana, Jovito N.; and Dolan, Donald T., to Pitney Bowes Inc. Platen module. 4,929,106, Cl. 400-649.000.

Buchner, Fritz. Motor vehicle water and mud splash guard. 4,928,994, Cl. 280-851.000.

Buerstinghaus, Rainer: *See—*
Leyendecker, Joachim; Buerstinghaus, Rainer; Theobald, Hans; Kuenast, Christoph; and Hofmeister, Peter, 4,929,617, Cl. 514-252.000.

Buhl, Rainer, to Balzers Aktiengesellschaft. Method and apparatus for coating workpieces. 4,929,321, Cl. 204-192.380.

Buhnen, Heinz D.: *See—*
Payer, - Wolfgang; Buhnen, Heinz D.; and Zoller, Wilhelm, 4,928,720, Cl. 137-13.000.

Bullis, Robert H.: *See—*
Wiegand, Walter J.; Swindal, James L.; Swarts, Richard E.; Bullis, Robert H.; Lopiccolo, Mario T.; Grantham, Daniel H.; and Foyt, Arthur G., 4,930,042, Cl. 361-280.000.

Bulman, Melvin J., to General Electric Company. Liquid propellant gun. 4,928,571, Cl. 89-7.000.

Bunker, James E., to Minnesota Mining and Manufacturing Company. Dentin and enamel adhesive. 4,929,746, Cl. 558-92.000.

Burdess, James S.; Fawcett, John N.; and Hewit, James R., to Burdess, James Stonehouse; and Fawcett, John Neville. Monitoring tension in an elongate flexible member. 4,928,538, Cl. 73-862.410.

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Burdess, James S.; Fawcett, John N.; and Hewit, James R., 4,928,538, Cl. 73-862.410.

Burger, Christa; Muller, Johann; and Bosch, Erhard, to Wacker-Chemie GmbH. Compositions which can be crosslinked by radiation to form elastomers. 4,929,647, Cl. 522-99.000.

Burger, Christian P.; Dudderar, Thomas D.; Gilbert, John A.; Peters, Bruce R.; and Smith, James A., to AT&T Bell Laboratories. Method and device for nondestructive evaluation. 4,928,527, Cl. 73-657.000.

Burgess, Dale L.: *See—*
Smith, Donald A.; Carter, William H.; Dingfelder, Howard E.; Burgess, Dale L.; and Gates, Alan B., 4,928,378, Cl. 29-564.600.

Burke, Robert J. Bimodal linear accelerator apparatus. 4,930,130, Cl. 372-2.000.

Burle Technologies, Inc.: *See—*
Smith, Edgar M., 4,929,833, Cl. 250-338.100.

Burlington Industries, Inc.: *See—*
Morrison, Elbert F., 4,928,464, Cl. 57-224.000.

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Burns, Gary T., to Dow Corning Corporation. Silane modified polysilacyclobutasilazanes. 4,929,742, Cl. 556-406.000.

Burns, Gary T.: *See—*
Atwell, William H.; Burns, Gary T.; and Saha, Chandan K., 4,929,573, Cl. 501-90.000.

Burns, Robert L. D.: *See—*
Watson, John C.; Gaskill, Stephen P.; Russell, David F.; and Burns, Robert L. D., 4,928,798, Cl. 188-218.0XL.

Burrington, James D.: *See—*
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Burroughs Wellcome Co.: *See—*
Johnston, Michael D.; and Berger, Henry, 4,929,444, Cl. 424-94.640.

Burstyn, Herschel, to Litton Systems, Inc. Apparatus for the optical measurement of spectra distribution. 4,929,080, Cl. 356-338.000.

Burton, Lester P. J.: *See—*
Keblys, Kestutis A.; Ao, Meng-Sheng; and Burton, Lester P. J., 4,929,745, Cl. 558-84.000.

Buslowski, Wolfgang: *See—*
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Bussey, Howard; Dmochowska, Aleksandra; Thomas, David Y.; and Dignard, Daniel, to Canadian Patents & Development Ltd. Protease for specific processing of secreted proteins. 4,929,553, Cl. 435-172.300.

Buth, C. Eugene; Qureshy, Asif; Ross, Hayes E., Jr.; and Sicking, Dean L., to Texas A&M University System, The. Guardrail extruder terminal. 4,928,928, Cl. 256-13.100.

Butler, David R.; Snow, George; Sandford, Philip; Neu, Max G.; Villani, Jean P.; Teyssedre, Alain; and Lenoir, Roland, to Foseco International Limited. Moulds for metal casting and sleeves containing filters for use therein. 4,928,746, Cl. 164-362.000.

Buyak, William P.; Testa, Bruce V.; and Right, Robert W., to General Signal Corporation. Electronic alarm horn. 4,929,924, Cl. 340-384.00E.

Buzbee, James M.: *See—*
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Bye, Moms Inc.: *See—*
Becker, Dawn M., 4,929,094, Cl 383-7.000.

Bye, Richard L., Jr.; Bose, Debasis; Das, Santosh K.; Datta, Amitava; and Adam, Colin M., to Allied-Signal Inc. Low temperature aluminum based brazing alloys. 4,929,511, Cl. 428-606.000.

Byrom, David, to Imperial Chemical Industries plc. Process for the production of microbial cellulose. 4,929,550, Cl. 435-101.000.

C. A. Weidmuller GmbH & Co.: *See—*
Steinkuhle, Ferdinand; Strate, Klaus; Durkop, Willi; and Moller, Ulrich, 4,929,186, Cl. 439-78.000.
Strate, Rudiger; Schulze, Rainer; Schnatwinkel, Michael; Wagner, Georg; Wilmes, Manfred; Haller, Bernd; Herkner, Ernst; Diekmann, Jorg; and Henning, Herbert, 4,929,198, Cl. 439-709.000.

C. R. Bard, Inc.: *See—*
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Cabison, Manuel R.: *See*—
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Cairns & Brother Inc.: *See*—
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Calfo, Raymond M.: *See*—
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California Institute of Technology: *See*—
Rembaum, Alan; Rhim, Won-Kyu; Hyson, Michael T.; and Chang, Manchium, 4,929,400, Cl. 264-10.000.
Calundann, Gordon W.: *See*—
DeMartino, Ronald N.; East, Anthony J.; and Calundann, Gordon W., 4,929,696, Cl. 526-312.000.
Calvet, Alain P.; Junien, Jean-Louis; Pascal, Ives R.; Pascaud, Xavier B.; and Roman, Francois J., to Jouveinal S.A. Benzodiazepines, process and intermediates for the preparation thereof and their application in therapy. 4,929,614, Cl. 514-214.000.
Camaggi, Giovanni: *See*—
Colle, Roberto; Camaggi, Giovanni; Gozzo, Franco; Ratti, Giuseppina; Garavaglia, Carlo; and Mirenna, Luigi, 4,929,631, Cl. 514-383.000.
Cambridge Engineering, Inc.: *See*—
Potter, Gary J.; Schlote, David S.; and Reinkemeyer. Robert W., 4,929,541, Cl. 432-222.000.
Cameron, Charles; Mimoun, Hubert; Bonnaudet, Serge; and Robine, Alain, to Institut Francais du Petrole. Process for converging methane to higher hydrocarbons. 4,929,787, Cl. 585-500.000.
Campanelli, Anthony S.; and Matre, Daniel A., to Rosestar• Incorporated. Flower stem cutter. 4,928,424, Cl. 47-1.010.
Campbell, James P. Holder for staples, carpet tacks, nails, screws and other discrete magnetizable items. 4,928,823, Cl. 206-338.000.
Campbell, Steven M., to U.S. Divers Company, Inc. Breathing mouthpiece for a snorkel. 4,928,710, Cl. 128-861.000.
Canada, National Research Council of Canada/Conseil National de Reserches du: *See*—
Vandersluis. Ron; and Quittner, Erik, 4,929,009, Cl. 294-2.000.
Canadian Patents & Development Ltd.: *See*—
Bussey, Howard; Dmochowska, Aleksandra; Thomas, David Y.; and Dignard, Daniel, 4,929,553, Cl. 435-172.300.
de Lasa, Hugo I., 4,929,798, Cl. 585-922.000.
Cancot Industries Inc.: *See*—
Friedman, Herbert D.; and Friedman, Mark A., 4,928,342, Cl. 15-145.000.
Cannella, Vincent D.: *See*—
Yaniv, Zvi; Cannella, Vincent D.; Hansell, Gregory L.; and Swartz, Louis D., 4,929,569, Cl. 437-51.000.
Canon Kabushiki Kaisha: *See*—
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Masuda, Takashi; and Sekiguchi, Kyoji, 4,929,076, Cl. 351-212.000.
Sakai, Kunihiro; Miyazaki, Toshihiko; Eguchi, Ken; Kawada, Haruki; Tomida, Yoshinori; Kimura, Toshiaki; Matsuda, Hiroshi; Takimoto, Kiyoshi; and Saito, Kenji, 4,929,524, Cl. 430-56.000.
Sato, Koichi; and Ikeda, Masami, 4,929,964, Cl. 346-1.100.
Sato, Mitsuya; Ukaji, Takao; Yamaguchi, Nobuhito; Ohmori, Taro; and Murakami, Eiichi, 4,929,893, Cl. 324-158.00F.
Shimizu, Akira; and Ikeda, Sotomitsu, 4,930,132, Cl. 372-22.000.
Sugiura, Susumu; Kouzato, Yasuo; and Masuda, Yukio, 4,930,007, Cl. 358-75.000.
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Uto, Nobutaka; Shido, Hironori; Saito, Jun; Hiroi, Masakazu; Kobayashi, Kenji; Murakami, Koichi; and Naito, Masataka, 4,928,941, Cl. 270-53.000.
Canterino, Peter J.: *See*—
Bahl, Surinder K.; Canterino, Peter J.; Cunningham, Theresa L.; Evans, Susan P.; and Shaw, Richard G., 4,929,681, Cl. 525-240.000.
Capamaggio, Scott A. Bookmarker. 4,928,621, Cl. 116-234.000.
Cardellina, John H., II; Stierle, Andrea C.; and Strobel, Gary A., to Research and Development Institute, Inc. at Montana State University. Method of inducing chlorosis in a knapweed plant. 4,929,270, Cl. 71-92.000.
Cardiac Pacemakers, Inc.: *See*—
Hauser, Robert G., 4,928,689, Cl. 128-419.00P.
Cardis, Angeline B., to Mobil Oil Corporation. Sulfurized olefin - glycerol monooleate adducts and lubricant compositions containing same. 4,929,253, Cl. 44-76.000.
Carey, David G.: *See*—
Nichols, Jerram B.; Hunter, Douglas; Herrington, Ronald M.; Serratelli, John F.; and Carey, David G., 4,929,646, Cl. 521-137.000.
Carey, Patrick H., Jr.; and Cowman, Charles D., Jr., to Minnesota Mining and Manufacturing Company. Stretchable insulating fabric. 4,929,492, Cl. 428-198.000.
Carey, William S.: *See*—
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Carlingswitch, Inc.: *See*—
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Carlisle Corporation: *See*—
Goodman, Ronald L.; and Kelley, Richard E., Sr., 4,928,443, Cl. 52-58.000.
Carlson, David K.; and Lindstrom, Paul R., to Applied Materials, Inc. Reactant gas injection for IC processing. 4,928,626, Cl. 118-715.000.
Carlson, William E.; and Metzler, Mark W., to Sundstrand Corporation. High power, high temperature disassemblable ceramic capacitor mount. 4,930,045, Cl. 361-329.000.
Carpenter, Larry L.; Hagerty, Robert J.; Maschmeyer, Richard O.; Morrell, Mark L.; and Schrauth, Peter A., to Corning Incorporated. Method of molding glass optical elements. 4,929,265, Cl. 65-64.000.
Carpenter, Paul R., to P. D. Enterprises, Inc. Arm and leg powered cycle. 4,928,986, Cl. 280-234.000.
Carpenter Technology Corporation: *See*—
Wegman, Dwight D.; Wanner, Edward A.; Rehrer, Wilson P.; and Widge, Sunil, 4,929,419, Cl. 420-56.000.
Carruthers, Alec R., to British Gas plc. Pipe burster. 4,928,866, Cl. 225-106.000.
Carter, William H.: *See*—
Smith, Donald A.; Carter, William H.; Dingfelder, Howard E.; Burgess, Dale L.; and Gates, Alan B., 4,928,378, Cl. 29-564.600.
Cartwright, Richard V., to Hercules Incorporated. Crash bag propellant composition and method for generating nitrogen gas. 4,929,290, Cl. 149-35.000.
Carty, William E., to U-Haul International. Truck ramp storage arrangement. 4,929,018, Cl. 296-204.000.
Casberg, John M., to Olin Corporation. Encased pool chemical capsule with extended ends and method of making the same. 4,928,813, Cl. 206-0.500.
Cashew Company, Ltd.: *See*—
Awano, Hikaru; Asai, Seiichi; Kaneko, Katsuo; Kaida, Hiroshi; and Yoshida, Fujio, 4,928,882, Cl. 239-112.000.
Casio Computer Co., Ltd.: *See*—
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Sugimoto, Naoshige; Yoshida, Tetsushi; and Toyama, Tadahisa, 4,929,060, Cl. 350-339.00F.
Caskey, Terrence L.; Trimmer, Johnny L.; and Jorgensen, Janine L., to Dow Chemical Company, The. Hollow fiber membrane fluid separation module for boreside feed. 4,929,259, Cl. 55-158.000.
Casserly, Edward W.: *See*—
Venier, Clifford G.; and Casserly, Edward W., 4,929,782, Cl. 585-375.000.
Castelaz, Patrick F., to Hughes Aircraft Company. Wavefront vector correlation processor and method. 4,930,099, Cl. 364-820.000.
Castelhano, Arlindo L.; DeYoung, Lawrence M.; Krantz, Alexander; Pliura, Diana H.; and Venuti, Michael C., to Syntex (U.S.A.) Inc. Transglutaminase inhibitors. 4,929,630, Cl. 514-380.000.
Castonguay, Roger N.: *See*—
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Caterpillar Inc.: *See*—
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Caterpillar Paving Products Inc.: *See*—
Lent, Kevin C.; Rife, Conwell K., Jr.; Simmons, Gerald P.; and Speck, Albert J., 4,929,121, Cl. 404-84.000.
Catotti, Arthur J., to Gates Energy Products, Inc. Wound electrode assembly for an electrochemical cell. 4,929,519, Cl. 429-94.000.
Cavezzan, Jacques; Frances, Jean-Marc; and Lancelin, Pierre, to Rhone-Poulenc Chimie. Tin monochelate catalysis of organopolysiloxane compositions. 4,929,702, Cl. 528-18.000.
Cearley, James E.: *See*—
Dixon, Robert C.; Cearley, James E.; Van Diemen, Paul; Sayre, Edwin D.; and Gordon, Gerald M., 4,929,412, Cl. 376-260.000.
Celgene Corporation: *See*—
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Central Glass Company, Limited: *See*—
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Cesa, Mark C.; Dubbert, Robert A.; and Burrington, James D., to Standard Oil Company, The. Process for making an optically active mixture of an N-acyl-amino acid or ester containing at least two chiral centers. 4,929,755, Cl. 562-443.000.
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Cetus Corporation: *See*—
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Chaffee, Edwin G., to American Laser Corporation. Segmented air cooled laser tube. 4,930,136, Cl. 372-62.000.
Chagneau, Francis; Levasseur, Michel; Landanger, Patrick; Langlais, Frantz; and Rolland, Jean-Jacques, to Landos Applications Orthopediques Francaises. Centro-medullary nailing rod. 4,928,679, Cl. 606-62.000.
Chambers, Timothy D. Thrown and bounced toy having a hand grip terminating in high bounce balls. 4,928,977, Cl. 273-428.000.
Champseix, Henri; and Champseix, Serge, to A.B.X. Device for automatically taking liquid from a bottle. 4,928,539, Cl. 73-864.240.
Champseix, Serge: *See*—
Champseix, Henri; and Champseix, Serge, 4,928,539, Cl. 73-864.240.
Chan, C. S.; Bearss, James G.; and Nelson, Terry M., to Hewlett-Packard Company. Method and system for enhancing the quality of both

color and black and white images produced by ink jet printers. 4,930,018, Cl. 358-298.000.
Chan, Eric: *See*—
Citron, Howard; Chan, Eric; and Dolan, Michael, 4,930,157, Cl. 379-433.000.
Chan, Yiu-Fai; and Hung, Chuan-Yung, to Altera Corporation. Method and apparatus for programming and verifying programmable elements in programmable devices. 4,930,107, Cl. 365-189.080.
Chandler, Donald G.; Nossen, Steve J.; and Simpson, Raymond W., to O'Neill Communications, Inc. Spread spectrum communication system. 4,930,139, Cl. 375-1.000.
Chang, Biau-Hung; Lee, Lester Y.; and Kwiatek, Jack, to Quantum Chemical Corporation. Process for converting polyketones to polyesters. 4,929,711, Cl. 528-220.000.
Chang, David B., to Hughes Aircraft Company. Dynamic infrared target. 4,929,841, Cl. 250-504.00R.
Chang, Jyh-Chin. Chair for reinforcement rod. 4,928,472, Cl. 52-678.000.
Chang, Manchium: *See*—
Rembaum, Alan; Rhim, Won-Kyu; Hyson, Michael T.; and Chang, Manchium, 4,929,400, Cl. 264-10.000.
Chang, Thomas T.: *See*—
Friedman, Don; and Chang, Thomas T., 4,929,936, Cl. 340-715.000.
Charcoal Cloth Limited: *See*—
Langston, Richard D.; Webb, Frances C.; and McBeath, Simon C., 4,928,681, Cl. 128-156.000.
Chauncey, Jeffrey B. Compactible futon. 4,928,337, Cl. 5-465.000.
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Hogenmuller, Roger; Chauvel, Bernard; and Daniel, Jean-Claude, 4,929,662, Cl. 524-376.000.
Chemisch Pharmazeutische Forschungsgesellschaft: *See*—
Binder, Dieter; and Rovensky, Franz, 4,929,616, Cl. 514-253.000.
Chemische Fabrik Stockhausen GmbH: *See*—
Chmelir, Miroslav, 4,929,717, Cl. 528-490.000.
Chen, A-Ten. Automatic drip infusion set. 4,929,234, Cl. 604-132.000.
Chen, Chao-Yang. Speed-adjusting mechanism of a tread mill. 4,928,956, Cl. 272-69.000.
Chen, Chia-Yin: *See*—
Chern, Ji-Wang; Liu, Kang-Chien; and Chen, Chia-Yin, 4,929,728, Cl. 544-284.000.
Chen, Frank: *See*—
Lehto, Ari; and Chen, Frank, 4,928,530, Cl. 73-756.000.
Chen, Fu, to Betz Laboratories, Inc. Calcium phosphate scale control methods. 4,929,362, Cl. 210-701.000.
Chen, Fu; and Carey, William S., to Betz Laboratories, Inc. Water treatment polymers and methods of use thereof. 4,929,695, Cl. 526-297.000.
Chen, Samuel J., to Kendall Company, The. Acrylic adhesive compositions having improved stability. 4,929,660, Cl. 524-236.000.
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Yamashita, Tsutomu T.; Shir, Ching-Cheng; and Chen, Tu, 4,929,500, Cl. 428-336.000.
Cheng, Roberta C.; Wessling, Ritchie A.; and Schmidt, Donald L., to Dow Chemical Company, The. Enzyme immobilization with polysulfonium salts. 4,929,556, Cl. 435-180.000.
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Cherukuri, Satyam C.: *See*—
Pryor, Michael J.; Fister, Julius C.; Singhdeo, Narendra N.; Mahulikar, Deepak; and Cherukuri, Satyam C., 4,929,516, Cl. 428-620.000.
Chesapeake Display and Packaging Company: *See*—
Mahl, Robert R., 4,929,116, Cl. 403-263.000.
Cheskis, Harvey P.: *See*—
Rooney, James F.; and Cheskis, Harvey P., 4,928,512, Cl. 72-404.000.
Chesney, Peter F.: *See*—
Feest, Eric A.; Chesney, Peter F.; and Coombs, Jeffrey S., 4,928,745, Cl. 164-46.000.
Chevrette, Roger N.: *See*—
Pickering, John H.; Bhatia, Sushil K.; Rath, Mihira K.; and Chevrette, Roger N., 4,928,995, Cl. 281-29.000.
Chevron, Inc.: *See*—
Nespor, Ronald R., 4,929,142, Cl. 414-563.000.
Chevron Research Company: *See*—
Freitas, Elizabeth A., 4,928,760, Cl. 166-113.000.
Pasek, Eugene A.; and Morgan, Norman C., 4,929,583, Cl. 502-64.000.
Chidester, Patrick H. Vehicle door latch. 4,929,004, Cl. 292-267.000.
Chieli, Davide, to SGS-Thomson Mircroelectronics S.r.l. Circuit for sensing the transistor current waveform. 4,929,883, Cl. 323-282.000.
Chin-Hua, Wang. Method used to purify smoke pollutant. 4,929,258, Cl. 55-86.000.
Chisso Corporation: *See*—
Daimon, Takashi; Sakamoto, Hideshi; and Akimoto, Osamu, 4,929,496, Cl. 428-246.000.
Chiuminatta, Alan R.: *See*—
Chiuminatta, Edward; and Chiuminatta, Alan R., 4,928,662, Cl. 125-13.010.
Chiuminatta, Edward; and Chiuminatta, Alan R. Skid plate for cutting unhardened concrete. 4,928,662, Cl. 125-13.010.
Chivas Products Limited: *See*—
Lorence, Brian S.; Phelps, Richard A.; and Grabowski, David N., 4,928,865, Cl. 224-275.000.
Chmelir, Miroslav, to Chemische Fabrik Stockhausen GmbH. Method of preparing polymers with a low residual content of monomers. 4,929,717, Cl. 528-490.000.
Chmielewski, Thomas A., Jr.; and Tarzaiski, Richard J., to General Electric Company. Apparatus and method for determining a dimension of an object. 4,929,843, Cl. 250-561.000.
Choi, Byung C.: *See*—
Altman, Lawrence J.; Choi, Byung C.; and Karsner, Grant G., 4,929,335, Cl. 208-106.000.
Christensen, Ronald L.: *See*—
Lilienthal, Cal A.; and Christensen, Ronald L., 4,929,017, Cl. 296-153.000.
Christison, S. Grant. Constant tension hoisting member. 4,928,925, Cl. 254-272.000.
Chrysler Corporation: *See*—
Luitje, William V.; and McCambridge, John M., 4,930,094, Cl. 364-561.000.
Chu, Chi Wai. Multiple-user interactive audio/video apparatus with automatic response units. 4,930,019, Cl. 358-335.000.
Chuang, Chuan-Tien;. Toy having sliding rail. 4,928,955, Cl. 272-31.00R.
Chucholowski, Alexander W.; Roth, Bruce D.; and Sliskovic, Drago R., to Warner-Lambert Company. 5-pyrimidinyl-3,5-dihydroxy-6-heptenoic acid compounds useful as inhibitors of cholesterol biosynthesis. 4,929,620, Cl. 514-269.000.
Chun, Victor L.; Hunter, James R.; and Jaworski, George, to Murata Wiedemann, Inc. Multitool punch holder. 4,929,276, Cl. 83-552.000.
Chung, Dennis B.: *See*—
Ruckenstein, Eli; and Chung, Dennis B., 4,929,510, Cl. 428-520.000.
Chung, Paul W.; Gee, Ralph L.; Lang, Luke C. K.; and Saber, Paik, to International Business Machines Corporation. Setting and dynamically adjusting VCO free-running frequency at system level. 4,929,918, Cl. 331-10.000.
Chung, Yu-Kuei. Balustrade. 4,928,930, Cl. 256-67.000.
Ciba-Geigy Corporation: *See*—
Albrecht, Bernhard; and Beyrich, Jurgen, 4,929,752, Cl. 562-70.000.
Clausen, Martin; Rys, Paul; and Junkuan, Wang, 4,929,771, Cl. 568-798.000.
Goldenberg, Merrill, 4,929,692, Cl. 526-247.000.
Gugumus, Francois, 4,929,652, Cl. 524-91.000.
Hung, William M.; and Su, Kai C., 4,929,250, Cl. 8-507.000.
Jaeggi, Knut A., 4,929,606, Cl. 514-80.000.
Meier, Hans R.; and Evans, Samuel, 4,929,732, Cl. 546-158.000.
Moser, Hans; Pissiotas, Georg; Brunner, Hans-Georg; Bohner, Beat; and Baumann, Marcus, 4,929,272, Cl. 71-95.000.
Ravichandran, Ramanathan, 4,929,657, Cl. 524-196.000.
Ravichandran, Ramanathan, 4,929,659, Cl. 524-155.000.
Schwander, Hansrudolf; Tzikas, Athanassios; and Aeschlimann, Peter, 4,929,719, Cl. 534-604.000.
Cina, Vincent J., Jr., to International Business Machines Corporation. Method to prevent use of incorrect program version in a computer system. 4,930,073, Cl. 364-300.000.
Cipriano, Robert A.; Snelgrove, R. Vernon; and McCullough, Francis P., Jr., to Dow Chemical Company, The. Solid electrolyte battery. 4,929,521, Cl. 429-102.000.
Citron, Howard; Chan, Eric; and Dolan, Michael, to Nynex Corporation. Telephone handset having apertures for key access. 4,930,157, Cl. 379-433.000.
Claar, Klaus: *See*—
Schrader, Jurgen; and Claar, Klaus, 4,929,020, Cl. 296-118.000.
Claas OHG: *See*—
Bruer, Dirk; Heidjann, Franz; and Hemker, Heinrich, 4,928,460, Cl. 56-14.600.
Claeys, Shane C. Iron worker's seat protector and gripping device. 4,928,789, Cl. 182-3.000.
Clanton, James A., to General Electric Company. Water removable solder stop. 4,929,284, Cl. 148-23.000.
Clark, Christopher J.: *See*—
Gupta, Victor R.; and Clark, Christopher J., 4,929,789, Cl. 585-643.000.
Clark, Howard W., to Dow Chemical Company, The. Inorganic anion exchangers and preparation thereof. 4,929,381, Cl. 252-174.250.
Clark, James B.; and Langley, Deborah E., to Phillips Petroleum Co. Biofilm control. 4,929,365, Cl. 210-754.000.
Clark, John; Martel, Brian J.; and Murray, James S. Automatic garage door operator with remote load control. 4,929,877, Cl. 318-560.000.
Clark, Robert J.; and Binish, Patrick W., to Prince. Full windshield sunshade. 4,929,014, Cl. 296-97.800.
Clausen, Martin; Rys, Paul; and Junkuan, Wang, to Ciba-Geigy Corporation. Process for the preparation of alkyl-substituted phenols or naphthols. 4,929,771, Cl. 568-798.000.
Claypool, Mark P., to Emhart Industries, Inc. Inspecting glass containers for line-over finish defects with bifurcated fiber optic bundle. 4,929,828, Cl. 280-223.00B.
Clayton, James E. Method and apparatus for removing and collecting dust. 4,928,348, Cl. 15-345.000.
Clegg, Michael W.: *See*—
Harwood, Jon W.; Karlgaard, Wayne A.; and Clegg, Michael W., 4,928,372, Cl. 29-890.080.
Clement, Heinz, to Rieter Machine Works, Ltd. Lap guide arrangement for a combing machine. 4,928,357, Cl. 19-225.000.
Clements, Thomas W.: *See*—
Fallon, Merton R.; and Clements, Thomas W., 4,928,850, Cl. 222-3.000.
Cliffe, Ian A., to John Wyeth and Brothers Limited. Ethers. 4,929,625, Cl. 514-304.000.

Clorox Company, The: *See—*
Haendler, Blanca L., 4,929,383, Cl. 252-187.260.
Clough, Robert L. Continuously variable transmission. 4,929,218, Cl. 474-83.000.
CMI Corporation: *See—*
Swisher, George W., Jr., 4,928,890, Cl. 241-24.000.
Coates, Jan H.: *See—*
Tyers, Michael B.; Coates, Jan H.; Humber, David C.; Ewan, George B.; and Bell, James A., 4,929,632, Cl. 514-397.000.
Cobar, Inc.: *See—*
Cohen, Jay B., 4,928,828, Cl. 206-444.000.
Coburn, Charles E.: *See—*
Schmidt, Donald L.; McCrackin, Perry J.; and Coburn, Charles E., 4,929,666, Cl. 524-516.000.
Coburn Optical Industries Inc.: *See—*
Gray, Roy R., 4,928,433, Cl. 51-33.00W.
Cochran, William H. Modular rigid inflatable aquatic vessel structure. 4,928,619, Cl. 114-345.000.
Cody, Ian A.; Hamner, Glen P., deceased (by Hamner, Annabelle, executrix); and Schorfheide, James T., to Exxon Research and Engineering Company. Method for isomerizing wax to lube base oils using an isomerization catalyst. 4,929,795, Cl. 585-739.000.
Coe, David J.: *See—*
Bird, Philip H.; Coe, David J.; Paxman, David H.; and Korteling, Aart G., 4,929,884, Cl. 323-313.000.
Coeur Laboratories, Inc.: *See—*
Baum, Thomas M., 4,929,238, Cl. 604-208.000.
Cogburn, Larry A., to University of Deleware. Endocrine manipulation to improve body composition of poultry. 4,929,600, Cl. 514-2.000.
Cohen, Jay B., to Cobar, Inc. Storage holder for computer diskettes. 4,928,828, Cl. 206-444.000.
Coherent Communications Systems Corp.: *See—*
Paul, Christopher R., 4,929,849, Cl. 307-269.000.
Colazzi, Franco; and Vignotto, Angelo, to RIV-SKF Officine di Villar Perosa S.p.A. Method of making a seal for bearing assembly. 4,928,371, Cl. 29-898.064.
Colgate-Palmolive Co.: *See—*
Thomas, James M.; and Kern, Ronald D., 4,929,367, Cl. 252-8.800.
Colin Electronics Co., Ltd.: *See—*
Harada, Chikao, 4,928,700, Cl. 128-672.000.
Harada, Chikao; and Niwa, Minoru, 4,928,701, Cl. 128-677.000.
Collas, Wolfgang; Wolfertz, Gunter; and Wolfertz, Roger, to Schaeffer GmbH. Button, particularly for articles of clothing. 4,928,362, Cl. 24-90.00R.
Colle, Roberto; Camaggi, Giovanni; Gozzo, Franco; Ratti, Giuseppina; Garavaglia, Carlo; and Mirenna, Luigi, to Agrimont S.r.l. Fungicide azolyl-derivatives. 4,929,631, Cl. 514-383.000.
Colles, Michael J.; and Smith, George R., to Medical Laser Uit of Heriot-Watt University of Research Park. Flexible guides for infrared energy. 4,929,052, Cl. 350-96.320.
Collette, Wayne N.; and Armstrong, Ralph, to Continental PET Technologies, Inc. Injection molded preform, method of treating same and container formed therefrom. 4,928,835, Cl. 215-31.000.
Collins, Dannie R.: *See—*
Gazda, Imre I.; and Collins, Dannie R., 4,928,761, Cl. 166-123.000.
Collins, Donald A., Jr., to NCR Corporation. Method and apparatus for customer performed article scanning in self-service shopping. 4,929,819, Cl. 235-383.000.
Colombo, Attilio, to Tonali S.p.A. Security vestibule entry for controlled access to banks and the like. 4,928,429, Cl. 49-41.000.
Colt Industries Inc.: *See—*
Bauerle, David D., 4,929,260, Cl. 55-510.000.
Columbia University in the City of New York, The Trustees of: *See—*
Rose, Eric; and Dresdale, Arthur, 4,928,603, Cl. 106-124.000.
Comelz S.p.A.: *See—*
Zorzolo, Luciano, 4,929,296, Cl. 156-357.000.
Comfortex Corporation: *See—*
Schnebly, John; and Marusak, Thomas J., 4,928,369, Cl. 29-24.500.
Commissariat a l'Energie Atomique: *See—*
Latge, Christian, 4,928,497, Cl. 62-55.500.
Valette, Serge, 4,929,302, Cl. 156-657.000.
Communications Satellite Corporation: *See—*
Sorbello, Robert M.; Efland, John E.; and Zaghloul, Amir I., 4,929,959, Cl. 343-700.0MS.
Conaghan, Thomas B.; Gladfelter, Harry F.; Kite, Joseph S., III; and Tresslar, Marie C., to Bentley-Harris Manufacturing Company, The. Protective fabric sleeves. 4,929,478, Cl. 428-35.100.
Conn-Weld Industries, Inc.: *See—*
Connelly, James D.; and Huff, Darrel, 4,928,551, Cl. 74-606.00R.
Connaughton, James M., Jr.; Sexton, James E.; and Hegener, James A., to Mallinckrodt, Inc. Flour-based pot pie crusts with improved texture. 4,929,455, Cl. 426-92.000.
Connelly, James D.; and Huff, Darrel, to Conn-Weld Industries, Inc. Vibrating mechanism. 4,928,551, Cl. 74-606.00R.
Container Products Corp.: *See—*
Hughes, Joel J., 4,928,440, Cl. 51-426.000.
Continental Baking Company: *See—*
Moshier, Mark; and Politte, Ron, 4,928,592, Cl. 99-450.800.
Continental PET Technologies, Inc.: *See—*
Collette, Wayne N.; and Armstrong, Ralph, 4,928,835, Cl. 215-31.000.
Cook, Ian A.: *See—*
Bassett, C. Andrew L.; and Cook, Ian A., 4,928,959, Cl. 272-96.000.
Cook, Peter, to National Research Development Corporation, The. Alloy useful particularly in dentistry. 4,929,420, Cl. 420-466.000.
Cookson Group plc: *See—*
Tucker, Kay L.; and Ma, Ulysses, 4,929,423, Cl. 420-561.000.
Coombs, Jeffrey S.: *See—*
Feest, Eric A.; Chesney, Peter F.; and Coombs, Jeffrey S., 4,928,745, Cl. 164-46.000.
Cooper, Gary F., to Syntex (U.S.A.) Inc. Process for making 16-phenoxy- and 16-(substituted phenoxy)-prostatrienoic acid derivatives. 4,929,740, Cl. 549-415.000.
Cooper Industries, Inc.: *See—*
Gurevich, Leon, 4,928,384, Cl. 29-623.000.
Kalra, Varinder K.; and Spalding, Keith A., 4,929,921, Cl. 337-233.000.
Woodworth, Jonathan J.; Johnson, Stephen P.; Miller, David R.; Kester, Jeffrey J.; and Kershaw, Stanley S., Jr., 4,930,039, Cl. 361-127.000.
Coppini, Massimo: *See—*
Vinciguerra, Constantino; and Coppini, Massimo, 4,929,119, Cl. 403-359.000.
Coquelet, Claude; Roussillon, Samia; Sincholle, Daniel; Bonne, Claude; and Alazet, Alain, to Laboratoires Chauvin-Blache. New derivatives of 4-vinyl benzoic acid, process for their preparation and their uses in therapeutics and as ligands. 4,929,635, Cl. 514-438.000.
Cordis Corporation: *See—*
Marques, Jose A., 4,928,528, Cl. 73-40.000.
Corenman, James E.: *See—*
Goodman, David E.; and Corenman, James E., ..,928,692, Cl. 128-633.000.
Corica, Joseph P. Surfboards for doing aerials. 4,929,208, Cl. 441-75.000.
Corlett, William R.: *See—*
Bradbury, Harold M.; Pfenning, Dwight B.; Corlett, William R.; and Mays, Roscoe, Jr., 4,929,818, Cl. 235-381.000.
Cornell, John, to Medi-Tech International Corporation. Transparent wound dressings in sheet form. 4,929,577, Cl. 514-58.000.
Cornell Research Foundation, Inc.: *See—*
Risley, Michael S., 4,929,542, Cl. 435-2.000.
Cornette, H. Mitchell: *See—*
Siegfried, Robert W., II; Smith, Lonnie J.; and Cornette, H. Mitchell, 4,928,759, Cl. 166-65.100.
Corning Incorporated: *See—*
Carpenter, Larry L.; Hagerty, Robert J.; Maschmeyer, Richard O.; Morrell, Mark L.; and Schrauth, Peter A., 4,929,265, Cl. 65-64.000.
Cosmo Oil Co., Ltd.: *See—*
Yamazoe, Seigo; Nakai, Sadao; and Fukui, Yukimasa, 4,929,847, Cl. 250-573.000.
Costello, Kenneth A.; and MacMillan, Hugh F., to Varian Associates, Inc. Two stage light converting vacuum tube. 4,929,867, Cl. 313-525.000.
Cotteret, Jean; and Grollier, Jean F., to L'Oreal. Cosmetic screening composition in the form of an oil-in-water emulsion comprising a UV-A screening compound and a UV-B screening compound and its use for the protection of the skin against ultra-violet radiation. 4,929,439, Cl. 424-59.000.
Coughenour, Linda L.; Davis, Robert E.; Downs, David A.; Heffner, Thomas G.; Meltzer, Leonard T.; Moos, Walter H.; Moreland, David W.; and Tecle, Haile, to Warner-Lambert Company. Tetrahydropyridine oxime compounds. 4,929,734, Cl. 546-338.000.
Courval, Gregory J., to Alcan International Limited. Method of forming prelubricated finstock. 4,928,508, Cl. 72-42.000.
Cousin, Bernard M. Device for picking off and evaluating a pressure, in particular a pressure of a fluid. 4,928,702, Cl. 128-678.000.
Covex, S.A.: *See—*
Mondelo, Fernando C.; and Ferrero, Maria T. M., 4,929,440, Cl. 424-79.000.
Cowgill, Cynthia: *See—*
Halenbeck, Robert; Koths, Kriston; Cowgill, Cynthia; and Laird, Walter J., 4,929,700, Cl. 530-351.000.
Cowman, Charles D., Jr.: *See—*
Carey, Patrick H., Jr.; and Cowman, Charles D., Jr., 4,929,492, Cl. 428-198.000.
Cox, Michael G.: *See—*
Kimball, Dorr; Cox, Michael G.; and Cabison, Manuel R., 4,929,901, Cl. 324-529.000.
Cozac, Daniel; and Simon, Jean-Francois, to Glaverbel. Method of manufacturing glass. 4,929,266, Cl. 65-135.000.
Cragun, E. Brent: *See—*
Isham, William R.; Cragun, E. Brent; Gault, Christopher; and Wermeling, William J., 4,928,853, Cl. 222-108.000.
Craig, Raymond S.: *See—*
Wallace, W. Edward; Smith, H. Kevin; Lynch, W. Bryan; Craig, Raymond S.; and Pourarian, Fiaz, 4,928,496, Cl. 62-46.200.
Crayton, John W.: *See—*
Atkinson, Robert W.; Crayton, John W.; Portscheller, James I.; and Wood, Daniel C., 4,928,642, Cl. 123-180.00R.
Cregg, James M.; and Barringer, Kevin J., to Phillips Petroleum Company. Pichia transformation. 4,929,555, Cl. 435-172.300.
Crews, Gary A.: *See—*
Bremner, Douglas L.; Crews, Gary A.; and Musser, James A., 4,930,110, Cl. 367-56.000.
Cripps, Peter K.; and Plotnick, Michael A., to Agilis Corporation. Code division multiplex system using selectable length spreading code sequences. 4,930,140, Cl. 375-1.000.
Crook, Troy N., to Exxon Production Research Company. Well borehole sound source. 4,928,783, Cl. 181-106.000.

Crosafield Electronics Limited: *See—*
MacDonald, Lindsay W., 4,930,010, Cl. 358-78.000.

Crucible Societe Anonyme: *See—*
Van Der Walt, Nicholaas T., 4,929,897, Cl. 324-240.000.

Crumb, Donald A.: *See—*
Zander, Richard A.; Gaiser, Robert F.; Dillon, William F., Jr.; and Crumb, Donald A., 4,929,033, Cl. 303-9.630.

Cselt Centro Studi E Laboratori Telecommunicazioni S.P.A.: *See—*
Di Vita, Pietro, 4,929,264, Cl. 65-12.000.

Culbertson, Townley P.; Domagala, John M.; Hagen, Susan E.; and Sanchez, Joseph P., to Warner-Lambert Company. Antibacterial agents. 4,929,613, Cl. 514-210.000.

Cummins Engine Company, Inc.: *See—*
Villanyi, Tibor J.; and Westerson, Kevin W., 4,928,647, Cl. 123-400.000.

Cunningham, John A.; Prestjohn, Mark O.; Reed, Bobby P.; and Smith, Martin D., to Jamieson Film Company. Film transport system. 4,929,976, Cl. 354-322.000.

Cunningham, Theresa L.: *See—*
Bahl, Surinder K.; Canterino, Peter J.; Cunningham, Theresa L.; Evans, Susan P.; and Shaw, Richard G., 4,929,681, Cl. 525-240.000.

Cuno, Incorporated: *See—*
Meyering, Mark T.; and Ostreicher, Eugene A., 4,929,354, Cl. 210-321.610.

Cuozzo, Robert A.: *See—*
Viana, Luis M.; Cuozzo, Robert A.; Miceli, Michael L.; and Whitney, Kent A., 4,930,035, Cl. 361-54.000.

Curiel, Yoram, to TSL Incorporated. Tamper evident closure. 4,928,837, Cl. 215-250.000.

Currey, Lesley B. Seat pedestal mount. 4,928,620, Cl. 114-363.000.

Curtice-Burns, Inc.: *See—*
Meyer, Richard S., 4,929,463, Cl. 426-521.000.

Curtis, James H.: *See—*
Guzik, Andrzej T.; Curtis, James H.; Habbaba, Faris S.; and Shah, Kirit, 4,929,062, Cl. 350-345.000.

Cushman, Robert B.: *See—*
Kirsch, Wolff M.; Zhu, Yong H.; and Cushman, Robert B., 4,929,240, Cl. 606-151.000.

Cuypers, Michel J., to Fiberview Corporation. Fiber optic display. 4,929,048, Cl. 350-96.240.

Cyanamid Canada Inc.: *See—*
Robertson, Allan J.; and Gallivan, James B., 4,929,393, Cl. 252-609.000.

Dacey, Ernest A., Jr., to Utica Enterprises, Inc. Single station hemming tooling. 4,928,388, Cl. 29-798.000.

Dahle, Rolf N.: *See—*
Flesner, Larry D.; Eisenman, Welsey L.; Merriam, James D.; Bates, Richard L.; Dahle, Rolf N.; and Arrington, Douglas C., 4,929,831, Cl. 250-307.000.

Dahlstrom, Jack A.: *See—*
Deziel, Edward W.; Rueh, John T.; Sorlien, Mark D.; Dahlstrom, Jack A.; and Erismann, David W., 4,929,029, Cl. 300-21.000.

Dai Nippon Insatsu Kabushiki Kaisha: *See—*
Egashira, Noritaka; Suto, Kenichiro; and Muro, Atsushi, 4,929,591, Cl. 503-227.000.
Kanto, Jumpei; and Eguchi, Hiroshi, 4,929,592, Cl. 503-227.000.

Daicho, Norio; Kawahara, Masakatsu; Nitta, Jiro; Miyazaki, Koji; and Yonezawa, Keitaro, to Kabushiki Kaisha Neriki. Stop valve. 4,928,919, Cl. 251-89.000.

Daikin Industries Ltd.: *See—*
Furutaka, Yasuhisa; Aoyama, Hirokazu; and Honda, Tsunetoshi, 4,929,318, Cl. 204-157.600.
Osaka, Tatsuhiko; Terawaki, Hiroshi; and Okamoto, Mitsunari, 4,929,330, Cl. 204-402.000.

Daimler-Benz AG: *See—*
Bauer, Theodor, 4,929,015, Cl. 296-116.000.
Schrader, Jurgen; and Claar, Klaus, 4,929,020, Cl. 296-118.000.

Daimon, Takashi; Sakamoto, Hideshi; and Akimoto, Osamu, to Chisso Corporation. Electroconductive thermoplastic resin molded product. 4,929,496, Cl. 428-246.000.

Dainippon Ink and Chemicals, Inc.: *See—*
Inoue, Toshio; Mine, Takayuki; Izutsu, Hitoshi; Yamaguchi, Toshihide; Kobata, Fumihiro; and Kawabata, Juheiji, 4,929,665, Cl. 524-500.000.

Dainippon Screen Mfg. Co., Ltd.: *See—*
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McLagan, Angus; Pao, Gei-Jon; Un, Chong S.; and Pearce, John J., Jr., 4,930,065, Cl. 364-200.000.

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Kaye, Howard, 4,929,021, Cl. 297-193.000.

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Oberjatzas, Gunter; and Keesen, Heinz-Werner, 4,930,025, Cl. 360-64.000.

DeVilbiss Company, The: *See*—
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van Mondfrans, Gerardus H.; and de Vries, Pieter, 4,928,585, Cl. 101-129.000.

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Diekmann, Bernd: *See*—
Gebhardt, Axel; Diekmann, Bernd; and Schmidt, Rudiger, 4,928,428, Cl. 49-192.000.

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Dignard, Daniel: *See*—
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Meltzer, Elliott A.; and Diloia, Albert A., 4,928,345, Cl. 15-250.060.

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Donaldson, Charles W., to General Electric Company. Diameter gauge. 4,928,392, Cl. 33-178.00E.
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Otomura, Keiichiro; Yamashita, Takayuki; Kanemitsu, Setsuo; Nakabayashi, Shigetoshi; and Miki, Hideo, 4,929,430, Cl. 423-11.000.
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Cheng, Roberta C.; Wessling, Ritchie A.; and Schmidt, Donald L., 4,929,556, Cl. 435-180.000.
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Clark, Howard W., 4,929,381, Cl. 252-174.250.
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Kruelskie, Donald A., 4,928,839, Cl. 220-5.00R.
Laughner, Michael K.; and Ogoe, Samuel A., 4,929,663, Cl. 524-423.000.
Laughner, Michael K., 4,929,672, Cl. 525-63.000.
Laughner, Michael K.; Lancaster, Gerald M.; and Sun, Yun C., 4,929,673, Cl. 525-63.000.
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Nichols, Jerram B.; Hunter, Douglas; Herrington, Ronald M.; Serratelli, John F.; and Carey, David G., 4,929,646, Cl. 521-137.000.
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Wang, Richard H. S.; and Myers, Garry L., 4,929,654, Cl. 524-117.000.
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ECIA - Equipements et Composants pour l'Industrie Automobile: *See*—
Ballet, Jean-Noel, 4,928,366, Cl. 24-641.000
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Eliakim, Isaac. Optical viewing system. 4,929,075, Cl. 351-158.000.
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Ferrenberg, Allan J.; and Webber, William T. Regenerative internal combustion engine. 4,928,658, Cl. 123-543.000.
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Finley, Richard O., to Plastiflex Company International. Method and apparatus for creating a secondary source of power by a pump. 4,929,155, Cl. 417-53.000.
Finney, Robert E., to ITT Corporation. High density connector. 4,929,197, Cl. 439-660.000.
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Secord, Tyrone R., 4,929,024, Cl. 297-362.000.
Fisher, Frederick A.: *See—*
Kaylor, William R.; and Fisher, Frederick A., 4,929,960, Cl. 343-703.000.
Fiskars Oy Ab: *See—*
Linden, Olavi, 4,928,436, Cl. 51-80.0BS.
Fister, Julius C.: *See—*
Pryor, Michael J.; Fister, Julius C.; Singhdeo, Narendra N.; Mahulikar, Deepak; and Cherukuri, Satyam C., 4,929,516, Cl. 428-620.000.
Fitts, Frederick L., to Precision Devices Inc. Surface measuring instrument link arm assembly. 4,928,517, Cl. 73-105.000.
Fitzgibbons, Gary W.: *See—*
Henry, Paul T.; Haase, Roger L.; and Fitzgibbons, Gary W., 4,928,874, Cl. 229-74.000.
Fitzpatrick, Colleen: *See—*
Kroetch, Keith; and Fitzpatrick, Colleen, 4,928,442, Cl. 52-2.00J.
Flachglas Aktiengesellschaft: *See—*
Tunker, Gerhard, 4,929,493, Cl. 428-207.000.
Flakas, Gerald K.; and Dalman, Harold J., to General Electric Company. X-ray tube current control with constant loop gain. 4,930,146, Cl. 378-110.000.
Flanigan, Sean: *See—*
Sampson, Robert; and Flanigan, Sean, 4,928,445, Cl. 52-72.000.
Fleming, Shane D., to American Cyanamid. Metals recovery by flotation. 4,929,344, Cl. 209-166.000.
Flesner, Larry D.; Eisenman, Welsey L.; Merriam, James D.; Bates, Richard L.; Dahle, Rolf N.; and Arrington, Douglas C., to United States of America, Navy. Electron beam apparatus for testing infrared detectors in a cryogenically shielded environment. 4,929,831, Cl. 250-307.000.
Flint, Hollis M.; and Merkle, John R., to United States of America, Agriculture. Unnatural sex attractants for male pink bollworms and pinkspotted bollworms and use thereof. 4,929,441, Cl. 424-84.000.
Flood, Ted C.: *See—*
Keesey, Charles R.; and Flood, Ted C., 4,929,141, Cl. 414-412.000.
Florek, Bronislaw B., to ABC Consulting Services, Inc. Pegboard hanger anchor. 4,928,912, Cl. 248-221.200.
Fluoroware, Inc.: *See—*
Osgar, Michael L., 4,929,293, Cl. 156-158.000.
Flyct AB: *See—*
Olsson, Staffan, 4,929,875, Cl. 318-362.000.
Focke & Co. (GmbH & Co.): *See—*
Focke, Heinz, 4,928,817, Cl. 206-256.000.
Focke, Heinz; and Liedtke, Kurt, 4,929,226, Cl. 493-343.000.
Focke, Heinz, to Focke & Co. (GmbH & Co.). Packaging for a plurality of small packs, especially cigarette packs. 4,928,817, Cl. 206-256.000.
Focke, Heinz; and Liedtke, Kurt, to Focke & Co. (GmbH & Co.). Process and apparatus for producing and conveying pack blanks. 4,929,226, Cl. 493-343.000.
Foley, Susan F.: *See—*
Edmunds, Timothy; and Foley, Susan F., 4,929,560, Cl. 435-226.000.
Fong, Dodd W.: *See—*
Hoots, John E.; Johnson, Donald A.; Fong, Dodd W.; and Kneller, James F., 4,929,425, Cl. 422-13.000.
Foote, James C.: *See—*
Stevenson, George F.; Foote, James C.; and Hamlin, Humphrey A. S., 4,928,682, Cl. 128-202.260.
Ford Motor Company: *See—*
Fraser, Ian, 4,929,144, Cl. 414-799.000.
Mansour, Tahir M., 4,929,846, Cl. 250-571.000.
Singer, John C., III, 4,928,545, Cl. 74-473.0SW.
Steele, Duane F.; Warman, Eugene C.; and Hutter, Robert J., 4,929,157, Cl. 417-312.000.
Ford New Holland, Inc.: *See—*
Bohman, Carl E.; and Seymour, Shaun A., 4,929,904, Cl. 324-696.000.
Lippens, Christiaan A. C.; and Naaktgeboren, Adrianus, 4,928,462, Cl. 56-341.000.
Foreman, Larry R.; Gomez, Veronica M.; and Thomas, Michael H. Fixture for mounting small parts for processing. 4,929,306, Cl. 156-306.300.
Forman, Willis R., to Nilson, Ronald; and Sea View Enterprises, a part interest. Submersible observation vessel. 4,928,614, Cl. 114-66.000.
Formax, Inc.: *See—*
Lindee, Scott A., 4,928,591, Cl. 99-485.000.
Forrestal, Joseph M. Ice fishing apparatus and signaling device. 4,928,419, Cl. 43-17.000.
Forster, Heinz; Beck, Gunther; Klauke, Erich; Santel, Hans-Joachim; and Schmidt, Robert R., to Bayer Aktiengesellschaft. Novel 4,5-disubstituted 1,3-thiazol-2-yloxyacetamide herbicides. 4,929,743, Cl. 548-187.000.
Foseco International Limited: *See—*
Butler, David R.; Snow, George; Sandford, Philip; Neu, Max G.; Villani, Jean P.; Teyssedre, Alain; and Lenoir, Roland, 4,928,746, Cl. 164-362.000.
Foster, John W.: *See—*
Hatch, William R.; and Foster, John W., 4,929,370, Cl. 252-12.200.
Foster-Miller, Inc.: *See—*
Smirlock, Martin E.; Ribich, William A.; Marinaccio, Paul J.; and Sawaf, Bernard E., 4,928,575, Cl. 89-36.020.
Foster Wheeler U.S.A. Corporation: *See—*
Elliott, John D., Jr.; and DeBiase, Robert, 4,929,339, Cl. 208-131.000.
Fouche, Claude, to S.A.: Societe Europeenne de Propulsion. Method and apparatus for ultra-precise machining applied to executing atypical surfaces of revolution and to servo-controlled machining. 4,928,561, Cl. 82-1.110.
Fountain Fresh, Inc.: *See—*
Isham, William R.; Cragun, E. Brent; Gault, Christopher; and Wermeling, William J., 4,928,853, Cl. 222-108.000.
Foyt, Arthur G.: *See—*
Wiegand, Walter J.; Swindal, James L.; Swarts, Richard E.; Bullis, Robert H.; Lopiccolo, Mario T.; Grantham, Daniel H.; and Foyt, Arthur G., 4,930,042, Cl. 361-280.000.
Frame, Robert R.: *See—*
Pollastrini, Sheila; Bricker, Jeffery C.; and Frame, Robert R., 4,929,340, Cl. 208-189.000.
Franaszek, Peter A.; and Georgiou, Christos J., to International Business Machines Corporation. Collision crossbar switch. 4,929,940, Cl. 340-825.020.
Frances, Jean-Marc: *See—*
Cavezzan, Jacques; Frances, Jean-Marc; and Lancelin, Pierre, 4,929,702, Cl. 528-18.000.
Francke, Wittko, to BASF Aktiengesellschaft. Method and compositions for controlling the pear leaf blister moth, *Leucoptera scitella*. 4,929,779, Cl. 585-16.000.
Franklin, Ralph, to Akzo America Inc. Method of preparing dialkyl dicarbonates. 4,929,748, Cl. 558-276.000.
Franks, Jerry L., to South Carolina State Ports Authority. Restraining device. 4,928,790, Cl. 182-3.000.
Franz Plasser Bahnbaumaschinen-Industriegesellschaft GmbH: *See—*
Theurer, Josef; Oellerer, Friedrich; and Gruber, Leopold R., 4,929,816, Cl. 219-53.000.
Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H.: *See—*
Hansmann, Johann; and Ganz, Jorg, 4,928,599, Cl. 104-12.000.
Fraser, Ian, to Ford Motor Company. Apparatus for loading radiator fins into trays. 4,929,144, Cl. 414-799.000.
Frass, Werner: *See—*
Stephani, Trutz-Ulrich; Mohr, Dieter; Maisel, Britta; and Frass, Werner, 4,929,534, Cl. 430-191.000.
Fredenucci, Pierre: *See—*
Gersault, Patrice; Goguelin, Michel; and Fredenucci, Pierre, 4,929,308, Cl. 162-145.000.
Frederick, Earl, to Vehicle Safety Controls, Inc. Brake testing apparatus. 4,928,519, Cl. 73-126.000.
Fredrick, William R.; and Stuhler, Robert H. Lifting mechanism for heavy street gratings. 4,928,927, Cl. 254-279.000.
Freeman, Anthony; Blacknell, David; Quegan, Shaun; Ward, Ian A.; Oliver, Christopher J.; Finley, Ian P.; White, Richard G.; and Wood, James W., to General Electric Company, plc, The; and United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Synthetic aperture radar systems. 4,929,950, Cl. 342-25.000.
Freeman, Gerard L.: *See—*
Branovich, Louis E.; Smith, ernard; Freeman, Gerard L.; and Eckart Donald W., 4,929,418, Cl. 419-19.000.
Freitag, Helmut, to Boehringer Mannheim Corporation. Method and reagent for determination of an analyte via enzymatic means using a ferricyanide/ferric compound system. 4,929,545, Cl. 435-11.000.
Freitas, Elizabeth A., to Chevron Research Company. Downhole coupon holder. 4,928,760, Cl. 166-113.000.
Frene, Andre : *See—*
Prus, Eric; Frene, Andre ; Bordaz, Pascal; Guerange, Patrick; and Thome, Caryl, 4,928,880, Cl. 239-8.000.
Frentzel-Beyme, Johannes, to Palitex Project Company GmbH. Yarn brake mechanism for a two-for-one textile yarn twisting machine spindle assembly. 4,928,463, Cl. 57-58.860.
Freskos, John N., to Ethyl Corporation. Process for preparing 2-deoxynucleosides. 4,929,723, Cl. 536-23.000.
Frianeza-Kullberg, Teresita C.; and Barnette, Darrish W., to Lithium Corporation of America. Sodium removal, from brines. 4,929,588, Cl. 502-402.000.
Fricton, James R.: *See—*
Schiffman, Eric L.; Fricton, James R.; and Espy, Lawrence M., 4,928,707, Cl. 128-774.000.
Friedfeld, Howard: *See—*
Henderson, Don J.; Brady, Robert; Gamble, Foster R.; Hardt, James V.; Friedfeld, Howard; Salerno, Don; Swanson, Tad; and Sansing, Maureen R., 4,928,696, Cl. 128-644.000.
Friedman, Don; and Chang, Thomas T., to Home Security Systems, Inc. LED illuminated sign. 4,929,936, Cl. 340-715.000.
Friedman, Herbert D.; and Friedman, Mark A., to Cancot Industries Inc. Mop holder. 4,928,342, Cl. 15-145.000.
Friedman, Mark A.: *See—*
Friedman, Herbert D.; and Friedman, Mark A., 4,928,342, Cl. 15-145.000.
Friedrich Maurer Sohne GmbH & Co. KG: *See—*
Klawe, Ernst, 4,928,339, Cl. 14-16.100.
Friess, Alan; and Friess, Colin. Container for compact disks. 4,928,818, Cl. 206-309.000.
Friess, Colin: *See—*
Friess, Alan; and Friess, Colin, 4,928,818, Cl. 206-309.000.
Frito-Lay, Inc.: *See—*
Schonauer, Sylvia L.; Medina, Linda M.; and Neel, Donald V., 4,929,461, Cl. 426-438.000.
Froeschke, Wolfgang: *See—*
Veitenhansl, Rudolf; Froeschke, Wolfgang; and Piorr, Robert, 4,929,504, Cl. 428-395.000.

Frohlich, Jurg: *See—*
Engbert, Theodor; Frohlich, Jurg; Kubitza, Werner; Breidenbach, Peter; and Mennicken, Gerhard, 4,929,724, Cl. 540-202.000.

Fromm, Paul M.: *See—*
Barton, Arthur A.; DeBolt, Frederick C.; Elter, Michael R.; Fromm, Paul M.; Grossi, Frank A.; Miller, Mark T.; Rasch, Kenneth R.; and Szlucha, Thomas F., 4,929,983, Cl. 355-315.000.

Fruchtmann, Romanis: *See—*
Mohrs, Klaus; Raddatz, Siegfried; Fruchtmann, Romanis; Kohlsdorfer, Christian; and Muller-Peddinghaus, Reiner, 4,929,626, Cl. 514-311.000.

FSK Kabushiki Kaisha: *See—*
Itou, Kazumi; Ebe, Kazuyoshi; and Minagawa, Toshio, 4,929,486, Cl. 428-77.000.

Fu, Chia M.: *See—*
Lowery, Richard E.; Fu, Chia M.; and Maholland, Michael K., 4,929,336, Cl. 208-120.000.

Fu, Yun-Lung: *See—*
Jarovitzky, Peter A.; Fu, Yun-Lung; and Dexter, Robin W., 4,929,687, Cl. 525-328.200.

Fuchs, Jugen: *See—*
Koch, Heinrich; and Fuchs, Jugen, 4,929,243, Cl. 604-283.000.

Fuji Electric Co., Ltd.: *See—*
Kuroda, Masami; Hattori, Yoshimasa; and Furusho, Noboru, 4,929,525, Cl. 430-75.000.

Fuji Jukogyo Kabushiki Kaisha: *See—*
Abe, Kunihiro, 4,928,649, Cl. 123-414.000.
Hosaka, Hiroshi, 4,928,654, Cl. 123-486.000.
Naitoh, Takao; and Nakayama, Seidai, 4,928,637, Cl. 123-41.310.

Fuji Photo Film Co., Ltd.: *See—*
Furutsuchi, Nobuo; and Hirose, Takeshi, 4,929,540, Cl. 430-555.000.
Hara, Yoshio, 4,928,827, Cl. 206-416.000.
Hatori, Masami; Nozaki, Nobuharu; and Kamiyama, Kozi, 4,929,042, Cl. 350-96.130.
Hatori, Masami, 4,929,043, Cl. 350-96.130.
Inukai, Yuzo; and Nakayama, Mitsuyuki, 4,928,719, Cl. 137-1.000.
Kato, Eiichi; Ishii, Kazuo; Itakura, Ryosuke; and Sera, Hidefumi, 4,929,526, Cl. 430-87.000.
Kato, Eiichi; Ohno, Shigeru; Ishii, Kazuo; and Itakura, Ryosuke, 4,929,527, Cl. 430-92.000.
Kido, Keishiro; and Tezuka, Sigeru, 4,928,540, Cl. 73-864.110.
Miyazaki, Takao, 4,929,824, Cl. 364-525.000.
Miyoshi, Takahito; Kanazawa, Minoru; Sugisaki, Tsutomu; Yamada, Takuzi; and Okuzawa, Yasutoshi, 4,930,032, Cl. 360-132.000.
Morigaki, Masakazu; and Aoki, Kozo, 4,929,538, Cl. 430-551.000.
Murayama, Jin; Kudoh, Yoshimitsu; and Kondo, Ryuji, 4,930,006, Cl. 358-44.000.
Nishikawa, Nobuo; and Misu, Hiroshi, 4,929,533, Cl. 430-169.000.
Oshikoshi, Yuji; Suganuma, Yoshimi; Hara, Hiroshi; Shiota, Kazuo; Takehara, Nobumitsu; and Sakamoto, Kiichiro, 4,928,996, Cl. 283-109.000.
Saeki, Keiso; and Endo, Tosiaki, 4,929,530, Cl. 430-138.000.
Sakamoto, Kiichiro; and Iwasaki, Hideo, 4,929,974, Cl. 354-299.000.
Satou, Hiroyuki; and Ookawa, Norio, 4,928,897, Cl. 242-55.000.
Shidara, Shinichi, 4,929,975, Cl. 354-317.000.
Shiota, Kazuo, 4,930,009, Cl. 358-76.000.
Takahashi, Toshiro; Kameoka, Kimitaka; and Inagaki, Yoshio, 4,929,535, Cl. 430-264.000.
Takemoto, Satoru, 4,929,815, Cl. 219-501.000.
Tanaka, Mitsugu; and Sakai, Takeo, 4,929,277, Cl. 106-22.000.
Tezuka, Sigeru, 4,929,428, Cl. 422-100.000.
Uesugi, Akio; Dobashi, Ritsu; and Ohishi, Takeshi, 4,929,326, Cl. 204-206.000.
Usami, Toshimasa; and Shimomura, Akihiro, 4,929,411, Cl. 503-213.000.
Yamada, Takashi; Nomura, Masaaki; Yamamoto, Ryoichi; Matsubaguchi, Satoshi; and Nahara, Akira, 4,929,320, Cl. 204-192.200.
Yazawa, Hiromi; Inoda, Masahiro; and Kimura, Hideaki, 4,930,016, Cl. 358-296.000.

Fuji Xerox Co., Ltd.: *See—*
Mukai, Toshio; and Yamashita, Yoshiro, 4,929,730, Cl. 544-345.000.
Shinoki, Masayoshi; Takagi, Masahiro; Nagatsuka, Ikutaroh; Kumashiro, Koichi; Aoki, Takayoshi; and Takeda, Masayuki, 4,929,528, Cl. 430-108.000.

Fujie, Naofumi; Imaizumi, Tomoaki; Ito, Koji; and Okada, Shoji, to Aisin Seiki Kabushiki Kaisha. Self cleaning mirror for a vehicle. 4,929,072, Cl. 350-582.000.

Fujigaki, Takashi; Fujinaga, Yoshikazu; Tokuda, Shuichiro; Furukawa, Noriyuki; Ichimura, Kiyoshi; Shibuya, Yukio; and Iuchi, Shigeru, to Mitsubishi Rayon Co. Working equipment for roughening the side of optical fiber. 4,929,169, Cl. 425-385.000.

Fujii, Etsuo: *See—*
Iwagawa, Yoshihiro; Yahagi, Toshio; and Fujii, Etsuo, 4,929,036, Cl. 303-115.000.

Fujii, Toshihiro: *See—*
Kimura, Tetsuya; Fujii, Toshihiro; and Nii, Hiroki, 4,929,469, Cl. 427-54.100.

Fujimura, Masaki: *See—*
Nakanishi, Tatsuo; Tadokoro, Toyohiko; and Fujimura, Masaki, 4,928,972, Cl. 273-78.000.

Fujinaga, Yoshikazu: *See—*
Fujigaki, Takashi; Fujinaga, Yoshikazu; Tokuda, Shuichiro; Furukawa, Noriyuki; Ichimura, Kiyoshi; Shibuya, Yukio; and Iuchi, Shigeru, 4,929,169, Cl. 425-385.000.

Fujino, Shuichi: *See—*
Takeshita, Takuo; Sugihara, Tadashi; and Fujino, Shuichi, 4,929,597, Cl. 505-1.000.

Fujisawa Pharmaceutical Company, Ltd.: *See—*
Okuhara, Masakuni; Tanaka, Hirokazu; Goto, Toshio; Kino, Tohru; and Hatanaka, Hiroshi, 4,929,611, Cl. 514-183.000.
Setoi, Hiroyuki; Kuroda, Akio; Tanaka, Hirokazu; Hirai, Hideo; Marusawa, Hiroshi; and Hashimoto, Masashi, 4,929,639, Cl. 514-452.000.
Takenawa, Seishi; Takeda, Hideki; and Horikoshi, Mie, 4,929,451, Cl. 426-10.000.

Fujita, Akihiko: *See—*
Oikawa, Ryuetsu; and Fujita, Akihiko, 4,928,349, Cl. 16-2.000.

Fujita, Tadao, to Sony Corporation. Circuit for detecting motion in a video signal on the basis of detected correlation patterns. 4,930,012, Cl. 358-105.000.

Fujitsu Limited: *See—*
Hoashi, Akira; Akima, Hideo; Shimanuki, Haruki; and Matsubara, Yuji, 4,930,083, Cl. 364-426.020.
Iino, Hideyuki; Yoshitake, Akihiro; and Hida, Hidenori, 4,929,854, Cl. 307-480.000.
Kobayashi, Kenzo; Iwagaki, Yutaka; Hasegawa, Mitsuyo; and Suganuma, Kazushi, 4,930,119, Cl. 370-16.100.
Matsushima, Kouji, 4,930,149, Cl. 379-61.000.
Muto, Shunichi; Inata, Tsuguo; Takeuchi, Atsushi; and Sugiyama, Yoshihiro, 4,929,984, Cl. 357-4.000.
Okada, Yoshiyuki, 4,930,021, Cl. 358-451.000.
Sugiyama, Tsutomu, 4,930,108, Cl. 365-230.020.
Takasaki, Kanetake, 4,929,985, Cl. 357-15.000.
Yasuda, Hiroshi; and Suzuki, Masahiko, deceased, 4,929,838, Cl. 250-492.200.

Fujitsu Microcomputer Systems Limited: *See—*
Iino, Hideyuki; Yoshitake, Akihiro; and Hida, Hidenori, 4,929,854, Cl. 307-480.000.

Fujitsu VLSI Limited: *See—*
Sugiyama, Tsutomu, 4,930,108, Cl. 365-230.020.

Fujiwara, Hideo; Tottori, Takeshi; Inagoya, Osamu; and Mikami, Hirosuke, to Hitachi Maxell, Ltd. Method of the production of a magnetic head. 4,928,382, Cl. 29-603.000.

Fujiwara, Hiroshi: *See—*
Koda, Akihide; Kita, Jun'ichiro; Kuroki, Yoshiaki; Fujiwara, Hiroshi; Takamura, Shinji; and Yamano, Kayoko, 4,929,618, Cl. 514-253.000.

Fukamachi, Chiharu; Schumacher, Horst; Bewert, Wolfgang; and Schneider, Joachim, to BASF Aktiengesellschaft. Stable mixture containing oxidation-sensitive compounds, preparation thereof and use of a combination of substances for stabilizing oxidation-sensitive compounds. 4,929,774, Cl. 568-824.000.

Fukasawa, Yoshihito, to Kabushiki Kaisha Toshiba. Method and apparatus for sequential product processing with limited product bar code reading. 4,930,086, Cl. 364-468.000.

Fukayama, Yukio; and Oshima, Taku, to Babcock-Hitachi Kabushiki Kaisha. Control system for pulverized coal fired boiler. 4,928,604, Cl. 110-103.000.

Fukazawa, Minoru: *See—*
Sugihara, Kanji; Yamamoto, Motohiro; Kida, Tohru; and Fukazawa, Minoru, 4,929,472, Cl. 427-215.000.

Fukuda, Shinri, to NEC Corporation. Circuit for detecting a lock of a phase locked loop. 4,929,916, Cl. 331-1.00A.

Fukuhara, Hiroshi: *See—*
Matsunaga, Fujihisa; and Fukuhara, Hiroshi, 4,929,762, Cl. 568-361.000.

Fukui, Kazuyuki, to Minolta Camera Kabushiki Kaisha. Automatic paper feed device. 4,928,951, Cl. 271-113.000.

Fukui, Yukimasa: *See—*
Yamazoe, Seigo; Nakai, Sadao; and Fukui, Yukimasa, 4,929,847, Cl. 250-573.000.

Fukuro, Hiroyoshi. *See—*
Kohtoh, Noriaki; Tsuruoka, Yoshihiro; Abe, Toyohiko; and Fukuro, Hiroyoshi, 4,929,658, Cl. 524-219.000.

Fuller, Maurice J.: *See—*
Rysavy, Peter B.; and Fuller, Maurice J., 4,929,935, Cl. 340-712.000.

Fuller Research Corporation: *See—*
Fuller, Terry A., 4,929,045, Cl. 350-96.150.

Fuller, Terry A., to Fuller Research Corporation. Method and apparatus for aligning optical energy to a wave guide. 4,929,045, Cl. 350-96.150.

Funahashi, Hiroyuki: *See—*
Hirayama, Takanobu; Funahashi, Hiroyuki; Yokota, Eiji; Uehara, Mitsuyoshi; Kagami, Isao; Hasegawa, Makoto; and Mizuno, Masaru, 4,929,105, Cl. 400-625.000.

Funahashi, Nobuhiro; Yamashita, Toshio; and Ogawa, Hiroshi, to Mitsubishi Jukogyo Kabushiki Kaisha. Control device for freezer. 4,928,500, Cl. 62-193.000.

Furuhashi, Kenshi; and Sawada, Hiroyuki, to Kabushiki Kaisha Tokai Rika Denki Seisakusho. Headlight dimmer switch device. 4,929,806, Cl. 200-61.540.

Furukawa Co., Ltd.: *See—*
Saito, Shigeaki; Matsueda, Toshiharu; Kubota, Yoshihiro; and Iguchi, Masaaki, 4,929,572, Cl. 437-164.000.

Furukawa, Eiji: *See—*
Sawai, Kiichi; Kurono, Masayasu; Asai, Hiromiotu; Mitani, Takahiko; Ninomiya, Naohisa; Sugiyama, Takao; Furukawa, Eiji; and Michishita, Hisashi, 4,929,438, Cl. 424-10.000.

Furukawa, Noriyuki: *See—*
Fujigaki, Takashi; Fujinaga, Yoshikazu; Tokuda, Shuichiro; Furukawa, Noriyuki; Ichimura, Kiyoshi; Shibuya, Yukio; and Iuchi, Shigeru, 4,929,169, Cl. 425-385.000.

Furushima, Masakazu: *See—*
Suzuki, Akinori; Hyeon, Suong B.; Kajita, Toshio; Furushima, Masakazu; Yoshinaka, Shigeo; Suzuki, Takashi; Oda, Mitsunori; and Tanaka, Akinori, 4,929,267, Cl. 71-77.000.

Furusho, Noboru: *See—*
Kuroda, Masami; Hattori, Yoshimasa; and Furusho, Noboru, 4,929,525, Cl. 430-75.000.

Furuta, Futoru: *See—*
Itahana, Tsutomu; Kanno, Hideo; Ono, Tetsuo; Furuta, Futoru; Kobayashi, Susumu; Akimoto, Ryosaku; and Tanigaki, Ryuhei, 4,928,723, Cl. 137-116.300.

Furuta, Yoshikazu. Fishhook and method for producing the same. 4,928,423, Cl. 43-43.160.

Furutachi, Nobuo; and Hirose, Takeshi, to Fuji Photo Film Co., Ltd. Silver halide color photographic light-sensitive material. 4,929,540, Cl. 430-555.000.

Furutaka, Yasuhisa; Aoyama, Hirokazu; and Honda, Tsunetoshi, to Daikin Industries Ltd. Process for preparing halogenated alkane. 4,929,318, Cl. 204-157.600.

Fuse, Masashi, to Alps Electric Co. Optical writing head. 4,929,965, Cl. 346-107.00R.

Fuse, Toshikazu; Yamamoto, Atsushi; and Sano, Junji, to Kanebo Co., Ltd. Silk fiber having good abrasion resistance and good light resistance and methods for the preparation thereof. 4,929,248, Cl. 8-128.100.

Fuso Pharmaceutical Industries, Ltd.: *See—*
Shishido, Kihachi; Matsuoka, Masami; Ishihara, Noriyuki; and Tamura, Masahiro, 4,929,479, Cl. 428-35.200.

Futaba Denshi Kogyo K.K.: *See—*
Yamamoto, Michio; and Sekiya, Satoshi, 4,929,949, Cl. 341-176.000.

Gaal, Erik W.: *See—*
Verboom, Johannes J.; Baggen, Constant P. M. J.; Van Uijen, Cornelis M. J.; and Gaal, Erik W., 4,930,115, Cl. 369-59.000.

Gabriele, Darcy. Method and apparatus for power transmission from an engine. 4,928,552, Cl. 475-5.000.

Gage, Julie E.: *See—*
Bejarano-Wallens, Celso O.; Gage, Julie E.; and Hodapp, Donald, 4,929,456, Cl. 426-99.000.

Gagnebin, Gaston, to Omega SA. Extendable bracelet clasp with fine adjustment. 4,928,359, Cl. 24-71.00J.

Gagneur, Klaus: *See—*
Kusserow, Bernd; Gagneur, Klaus; and Hofler, Siegfried, 4,930,034, Cl. 361-19.000.

Gaiser, Robert F.: *See—*
Zander, Richard A.; Gaiser, Robert F.; Dillon, William F., Jr.; and Crumb, Donald A., 4,929,033, Cl. 303-9.630.

Gallivan, James B.: *See—*
Robertson, Allan J.; and Gallivan, James B., 4,929,393, Cl. 252-609.000.

Gamble, Foster R.: *See—*
Henderson, Don J.; Brady, Robert; Gamble, Foster R.; Hardt, James V.; Friedfeld, Howard; Salerno, Don; Swanson, Tad; and Sansing, Maureen R., 4,928,696, Cl. 128-644.000.

Ganz, Jorg: *See—*
Hansmann, Johann; and Ganz, Jorg, 4,928,599, Cl. 104-12.000.

Garavaglia, Carlo: *See—*
Colle, Roberto; Camaggi, Giovanni; Gozzo, Franco; Ratti, Giuseppina; Garavaglia, Carlo; and Mirenna, Luigi, 4,929,631, Cl. 514-383.000.

Garbosch, Reinhold. Racket, particularly a tennis or squash racket. 4,928,963, Cl. 273-73.00D.

Gas Research Institute: *See—*
Lee, Anthony L.; Meyer, Howard S.; and Hill, Vern L., 4,929,585, Cl. 502-220.000.
Lee, Douglas W., 4,928,775, Cl. 175-19.000.

Gaskill, Stephen P.: *See—*
Watson, John C.; Gaskill, Stephen P.; Russell, David F.; and Burns, Robert L. D., 4,928,798, Cl. 188-218.0XL.

Gaslevic, Emeric: *See—*
Urmson, William T., Jr.; Gaslevic, Emeric; and Junk, Ronald K., 4,928,600, Cl. 104-17.100.

Gaspardo, Luigi, to Gaspardo S.p.A. Electronically controlled pneumatic seeder. 4,928,607, Cl. 111-185.000.

Gaspardo S.p.A.: *See—*
Gaspardo, Luigi, 4,928,607, Cl. 111-185.000.

Gassen, James R.; and Suchdev, Lakhbir S., to Textron, Inc. Carburetor and oil pump assembly and method of making the same. 4,928,390, Cl. 30-123.400.

Gassman, Max P.; Larson, David J.; and Trampel, Darrell W., to Iowa State University Research Foundation, Inc. Egg inoculation device and method of using same. 4,928,628, Cl. 119-1.000.

Gastinger, Robert G.: *See—*
Dean, Barry D.; and Gastinger, Robert G., 4,929,677, Cl. 525-151.000.

Gat-Liquornik, Martin; and Naoumidis, Aristides, to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung. Process for joining ceramic parts with a reactive conducting material. 4,928,870, Cl. 228-107.000.

Gates, Alan B.: *See—*
Smith, Donald A.; Carter, William H.; Dingfelder, Howard E.; Burgess, Dale L.; and Gates, Alan B., 4,928,378, Cl. 29-564.600.

Gates Energy Products, Inc.: *See—*
Catotti, Arthur J., 4,929,519, Cl. 429-94.000.

Gauchel, James V.; Wilson, Edward L.; and Kerle, Edward J., to Owens-Corning Fiberglas Corporation. Process for forming thick ballistic resistant materials. 4,929,651, Cl. 523-505.000.

Gault, Christopher: *See—*
Isham, William R.; Cragun, E. Brent; Gault, Christopher; and Wermeling, William J., 4,928,853, Cl. 222-108.000.

Gazda, Imre I.; and Collins, Dannie R., to Otis Engineering Corporation. Two-way plugs for wells. 4,928,761, Cl. 166-123.000.

Gebert, Paul. Spinning top and projectile game. 4,928,968, Cl. 273-357.000.

Gebhardt, Axel; Diekmann, Bernd; and Schmidt, Rudiger, to Schuco Heinz Schurmann GmbH & Co. Lever-activated locking bar brace for a window or a door. 4,928,428, Cl. 49-192.000.

GEC Plessey Telecommunications Limited: *See—*
Smith, Raymond D.; and Marles, Robert, 4,930,046, Cl. 361-393.000.

Gee, Ralph L.: *See—*
Chung, Paul W.; Gee, Ralph L.; Lang, Luke C. K.; and Saber, Paik, 4,929,918, Cl. 331-10.000.

Gehl Company: *See—*
Dohnalik, Martin F., 4,929,143, Cl. 414-723.000.

Geiger, Gerhard; and Strafner, Michael, to Siemens Aktiengesellschaft. Data transmission method in a digital transmission network and apparatus for implimenting same. 4,930,103, Cl. 364-900.000.

Geisha Corporation: *See—*
Swadell, Robert A., 4,930,055, Cl. 362-244.000.

Geisser, Carl. Cable end sleeve magazine. 4,928,822, Cl. 206-330.000.

Gelfand, Mark: *See—*
Halperin, Henry; Tsitlik, Joshua; Weisfeldt, Myron; and Gelfand, Mark, 4,928,674, Cl. 128-30.200.

General DataCom, Inc.: *See—*
Bains, Kuldip S., 4,930,125, Cl. 370-105.000.

General Dispensing Systems Limited: *See—*
Young, Michael J. R., 4,928,584, Cl. 99-289.00T.

General Electric Company: *See—*
Bulman, Melvin J., 4,928,571, Cl. 89-7.000.
Chmielewski, Thomas A., Jr.; and Tarzaiski, Richard J., 4,929,843, Cl. 250-561.000.
Clanton, James A., 4,929,284, Cl. 148-23.000.
Davenport, John M.; and Hansler, Richard L., 4,930,049, Cl. 362-32.000.
Dixon, Robert C.; Cearley, James E.; Van Diemen, Paul; Sayre, Edwin D.; and Gordon, Gerald M., 4,929,412, Cl. 376-260.000.
Donaldson, Charles W., 4,928,392, Cl. 33-178.00E.
Flakas, Gerald K.; and Dalman, Harold J., 4,930,146, Cl. 378-110.000.
Golz, Thomas M., 4,930,051, Cl. 362-61.000.
Hibbert, David A., 4,929,801, Cl. 174-16.200.
Kerr, Stuart R., III; and Moore, James E., 4,929,506, Cl. 428-412.000.
Maslak, Chris E., 4,928,478, Cl. 60-39.050.
Meckley, John R., 4,930,076, Cl. 364-413.210.
Meiners, David J.; Morris, Robert A.; Arnold, David; Castonguay, Roger N.; and Palmieri, Joseph M., 4,929,920, Cl. 335-202.000.
Nutter, Norman E., 4,929,148, Cl. 415-32.000.
Oliver, Wayne R.; Moyer, Roy E.; and Girardin, Dennis R., 4,928,480, Cl. 60-39.092.
Sherwin, Karl F.; and Boehm, Manfred D., 4,930,145, Cl. 378-109.000.
Sudolnik, James M.; and Prince, Stephen R., 4,928,733, Cl. 137-630.130.
Tyrell, John A.; and McGready, Russell J., 4,929,716, Cl. 528-353.000.
Wacker, Thomas P.; and Zabinski, Raymond J., 4,929,305, Cl. 156-273.300.
Walton, Paul B.; Keough, James; Demers, Richard L.; Denny, Leland A., Jr.; Kaiser, Robert E.; Moses, Cornellius, Jr.; and Wagh, Vijay N., 4,930,151, Cl. 379-94.000.

General Electric Company, plc, The: *See—*
Freeman, Anthony; Blacknell, David; Quegan, Shaun; Ward, Ian A.; Oliver, Christopher J.; Finley, Ian P.; White, Richard G.; and Wood, James W., 4,929,950, Cl. 342-25.000.

General Engineering (Netherlands) B.V.: *See—*
Qvint, Peter; Andersson, Tommy; and Eksell, Lennart, 4,928,992, Cl. 280-801.000.

General Instrument Corporation: *See—*
Einthoven, Willem G., 4,929,987, Cl. 357-234.000.

General Motors Corporation: *See—*
Allen, John J., 4,928,374, Cl. 29-436.000.

General Signal Corporation: *See—*
Buyak, William P.; Testa, Bruce V.; and Right, Robert W., 4,929,924, Cl. 340-384.00E.

Genise, Thomas A.: *See—*
Markyvech, Ronald K.; and Genise, Thomas A., 4,928,544, Cl. 74-335.000.

George, Glen A.: *See—*
Whiting, Douglas L.; and George, Glen A., 4,930,142, Cl. 375-120.000.

George, Harry. Pivotable bumper guard. 4,928,430, Cl. 49-460.000.

Georgia State University Foundation, Inc.: *See*—
Strekowski, Lucjan; Mokrosz, Maria; and Harden, Donald B., 4,929,726, Cl. 544-122.000.

Georgia Tech Research Corporation: *See*—
Zinn, Ben T.; and Reiner, David, 4,929,172, Cl. 431-1.000.

Georgiou, Christos J.: *See*—
Franaszek, Peter A.; and Georgiou, Christos J., 4,929,940, Cl. 340-825.020.
Varma, Anujan M.; and Georgiou, Christos J., 4,929,939, Cl. 340-825.800.

Geraci, Alexander. Chair having lift apparatus. 4,929,022, Cl. 297-313.000.

Gerault, Patrice; Goguelin, Michel; and Fredenucci, Pierre, to Arjomari-Prioux. Papermaking process and composition for the production of tridimensional products containing thermoplastics resin and reinforcing fibers. 4,929,308, Cl. 162-145.000.

Gereby, John L.; Gifford, Eric P.; Wehrmann, Rick S.; and Easter, William M., to Automated Packaging Systems, Inc. Packaging machine and method. 4,928,455, Cl. 53-570.000.

Gerfast, Sten R. Transformerless current-limiting circuit. 4,929,871, Cl. 315-205.000.

Gerke, Burton E., Jr.: *See*—
Elson, Donald E.; Gerke, Burton E., Jr.; Bitzel, Michael E.; Wilder, Bruce A.; Rodowsky, Stanley J., Jr.; Lesnig, William R., III; Adams, Jeffrey S.; and Hagan, Todd A., 4,928,346, Cl. 15-338.000.

Gerstenberger, Friedrich: *See*—
Bordt, Wolfgang; and Gerstenberger, Friedrich, 4,928,661, Cl. 124-69.000.

Gerster, John F.; and Knafla, Roy T., to Minnesota Mining and Manufacturing Company. Olefinic 1H-imidazo(4,5-c)quinolin-4-amines. 4,929,624, Cl. 514-293.000.

Gerth, Howard L.: *See*—
O'Connor, Daniel G.; and Gerth, Howard L., 4,928,532, Cl. 73-856.000.

Getty, Edward E.: *See*—
Drago, Russell S.; and Getty, Edward E., 4,929,800, Cl. 585-744.000.

Geyer, Paul. Continuous rate feed hopper. 4,929,086, Cl. 366-76.000.

Gianfranco, Cassanelli, to Trimate. Lapping internal surfaces. 4,928,434, Cl. 51-3.40H.

Gibbons, Charles E.; Marano, Gerald A.; Kittrell, James M.; Whillock, Allan A.; Lanham, Robert L.; and Evans, Donald, to International Paper Company. Oxygen impermeable leak free container. 4,929,476, Cl. 428-34.200.

Gibson, Charles L.: *See*—
Lentz, Carl M.; Mullins, Edward T.; and Gibson, Charles L., 4,929,737, Cl. 548-365.000.

Gibson, Harry W.; and Jois, Yajnanarayana H. R., to Virginia Polytechnic Institute and State University. Preparation of open chain poly(-reissert compounds). 4,929,713, Cl. 528-230.000.

Gieger, Eckhard: *See*—
Dedden, Hubert; Gieger, Eckhard; and Lauer, Christian, 4,929,829, Cl. 250-208.400.

Gielen, Franz-Josef: *See*—
Nouvertne, Werner; Gielen, Franz-Josef; Tacke, Peter; Grigo, Ulrich; Quiring, Bernd; and Lindner, Christian, 4,929,674, Cl. 325-66.000.

Giersch, Wolfgang K.; and Schulte-Elte, Karl-Heinrich, to Firmenich SA. Perfuming ingredient. 4,929,599, Cl. 512-18.000.

Gifford, David R., to Honeywell Inc. Selective integrated circuit interconnection. 4,929,995, Cl. 357-34.000.

Gifford, Eric P.: *See*—
Gereby, John L.; Gifford, Eric P.; Wehrmann, Rick S.; and Easter, William M., 4,928,455, Cl. 53-570.000.

Giglia, Robert D., to American Cyanamid Company. Fibrillated fibers and articles made therefrom. 4,929,502, Cl. 428-357.000.

Gilbert, Barrie, to Analog Devices, Inc. Differential amplifier with gain compensation. 4,929,909, Cl. 330-256.000.

Gilbert, John A.: *See*—
Burger, Christian P.; Dudderar, Thomas D.; Gilbert, John A.; Peters, Bruce R.; and Smith, James A., 4,928,527, Cl. 73-657.000.

Gilbert, Scott J.: *See*—
Bodai, Balazs I.; Grandon, Michael D.; Gilbert, Scott J.; Littlejohn, Douglas J.; Lemons, Kyle E.; Fellows, Richard L.; Barry, Michael R.; and Delapp, Michael D., 4,929,426, Cl. 422-63.000.

Gilbertson, Thomas A.; Meyers, Michael R.; and Kinneberg, Bruce, to Reaction Thermal Systems, Inc. Ice building, chilled water system and method. 4,928,493, Cl. 62-185.000.

Girardin, Dennis R.: *See*—
Oliver, Wayne R.; Moyer, Roy E.; and Girardin, Dennis R., 4,928,480, Cl. 60-39.092.

Girault, Jean-Philippe, to Societe Europeenne de Propulsion. Turbopump with actine suspension for a propulsion system. 4,929,158, Cl. 417-405.000.

Giza, John, to Acushnet Company. Process of making a golf ball cover. 4,929,407, Cl. 264-101.000.

GKN Automotive, Inc.: *See*—
Hahn, Steven C., 4,929,203, Cl. 440-75.000.

Gladfelter, Harry F.: *See*—
Conaghan, Thomas B.; Gladfelter, Harry F.; Kite, Joseph S., III; and Tresslar, Marie C., 4,929,478, Cl. 428-35.100.

Glamkowski, Edward J.; and Kurys, Barbara E., to Hoechst-Roussel Pharmaceuticals Inc. 7H-benzo[b]pyrazino[1,2-d]pyrrolo[3,2,1-jk][1,4]benzodiazepines. 4,929,615, Cl. 514-219.000.

Glamm, Paul R., to American Standard Inc. Incremental electrically actuated valve. 4,928,494, Cl. 62-222.000.

Glaverbel: *See*—
Cozac, Daniel; and Simon, Jean-Francois, 4,929,266, Cl. 65-135.000.

Glaxo Group Limited: *See*—
Tyers, Michael B.; Coates, Jan H.; Humber, David C.; Ewan, George B.; and Bell, James A., 4,929,632, Cl. 514-397.000.

Globe-Union Inc.: *See*—
Bowen, Gerald K.; and Zagrodnik, Jeffrey P., 4,929,325, Cl. 204-268.000.

Glover, Douglas L., to Motorola Inc. Programmable pad printer. 4,928,587, Cl. 101-42.000.

Godfrey, Darryl A., to Eastman Kodak Company. Adhesives based on amorphous propylene/hexene copolymers. 4,929,509, Cl. 428-461.000.

Goeddel, David V.; and Gray, Patrick W. Human immune interferon. 4,929,554, Cl. 435-172.300.

Goertz, Hans-Helmut; Denzinger, Walter; and Raubenheimer, Hans-Juergen, to BASF Aktiengesellschaft. Preparation of metal salts of carboxyl-containing polymers. 4,929,690, Cl. 525-366.000.

Goetz, Norbert: *See*—
Smuda, Hubert; Hoelderich, Wolfgang; Goetz, Norbert; and Recker, Hans-Gert, 4,929,765, Cl. 568-427.000.

Goguelin, Michel: *See*—
Gerault, Patrice; Goguelin, Michel; and Fredenucci, Pierre, 4,929,308, Cl. 162-145.000.

Gohshi, Yoshihiro: *See*—
Matsubara, Saburo; Gohshi, Yoshihiro; Kobayashi, Seizo; and Usui, Katsumi, 4,929,680, Cl. 525-240.000.

Gold, Kenneth; and Brodman, Bruce, to United States of America, Army. Chemical and enzymatic process for the denitration of diethyleneglycol dinitrate, nitroglycerin and other nitrate esters. 4,929,552, Cl. 435-128.000.

Golden, Michael D., to Western Design Corporation. Ammunition magazine system. 4,928,574, Cl. 89-34.000.

Goldenberg, Merrill, to Ciba-Geigy Corporation. Crosslinked copolymers and ophthalmic devices made from vinylic macromers containing perfluoropolyalkyl ether and polyalkyl ether segments and minor amounts of vinylic comonomers. 4,929,692, Cl. 526-247.000.

Golder, Michael D., to Hoechst Celanese Corporation. Blends copolyester elastomers and chlorinated polyethylene. 4,929,656, Cl. 524-195.000.

Goldman, Leon; Drake, Ellet H.; and Goldman, Steven. Laser diagnostic and treatment device. 4,928,695, Cl. 128-642.000.

Goldman, Steven: *See*—
Goldman, Leon; Drake, Ellet H.; and Goldman, Steven, 4,928,695, Cl. 128-642.000.

Golicz, Roman M., to Intelligent Technologies Corporation. High speed sheet feeder singulator. 4,928,944, Cl. 271-6.000.

Golz, Thomas M., to General Electric Company. Headlamp with sloped lens including beam-spreading flutes. 4,930,051, Cl. 362-61.000.

Gomez, Veronica M.: *See*—
Foreman, Larry R.; Gomez, Veronica M.; and Thomas, Michael H., 4,929,306, Cl. 156-306.300.

Gonella, Mario: *See*—
Baggio, Giorgio; Gonella, Mario; and Sartor, Mariano, 4,928,408, Cl. 36-119.000.

Gonon, Jean-Louis; and Moulin, Pierre, to Arnould Fabrique d'Appareillage Electrique. Insulation displacement connector. 4,929,190, Cl. 439-409.000.

Gonpei, Katsuhiro: *See*—
Tominaga, Mamoru; Kokado, Naoyuki; Gonpei, Katsuhiro; Nira, Hisami; and Taya, Akira, 4,929,061, Cl. 350-338.000.

Good, Laverne C. Extensible level. 4,928,395, Cl. 33-374.000.

Goodin, Richard L.; Rydell, Mark A.; and Shockey, Rick L., to Schneider (USA), Inc. Pressure monitor catheter. 4,928,693, Cl. 128-637.000.

Goodman, David E.; and Corenman, James E. Method and apparatus for detecting optical pulses. 4,928,692, Cl. 128-633.000.

Goodman, Ronald L.; and Kelley, Richard E., Sr., to Carlisle Corporation. Pourable sealer pocket. 4,928,443, Cl. 52-58.000.

Goodyear Tire & Rubber Company, The: *See*—
Allen, Terry F.; and Schisler, Robert C., 4,929,688, Cl. 525-332.500.
Rye, Grover W.; and Pitman, John C., 4,928,741, Cl. 152-504.000.
Van Der Poel, Robert J.; and Wantz, Armand, 4,929,298, Cl. 156-414.000.
Wideman, Lawson G.; and Botzman, Thomas J., 4,929,280, Cl. 106-472.000.

Gopalakrishnan, Jagannatha; and Subramanian, Munirpallam A., to Du Pont de Nemours, E. I., and Company. Superconducting composition $Tl_2Ba_2CuO_{6+x}$ and process for manufacture. 4,929,594, Cl. 505-1.000.

Gordon Barlow Design: *See*—
Barlow, Gordon A., 4,928,960, Cl. 273-1.0GG.

Gordon, Gerald M.: *See*—
Dixon, Robert C.; Cearley, James E.; Van Diemen, Paul; Sayre, Edwin D.; and Gordon, Gerald M., 4,929,412, Cl. 376-260.000.

Gordon, Richard A. Cat toy. 4,928,632, Cl. 119-29.500.

Gosselin, Roland: *See*—
Murphy, Robert H.; and Gosselin, Roland, 4,928,820, Cl. 206-328.000.

Gossler, Ewald. Method and device for compression of gases. 4,928,498, Cl. 62-81.000.

Goswami, Kisholoy: *See—*
Le Goullon, Donald; and Goswami, Kisholoy, 4,929,049, Cl. 350-96.290.

Goto, Toshio: *See—*
Okuhara, Masakuni; Tanaka, Hirokazu; Goto, Toshio; Kino, Tohru; and Hatanaka, Hiroshi, 4,929,611, Cl. 514-183.000.

Gotoh, Yoshihiko; and Kawai, Toshikazu, to Central Glass Company, Limited. Preparation of trifluoromethylbenzoic acid from hexafluoroxylene. 4,929,753, Cl. 562-411.000.

Gottschalk, Gerhard: *See—*
Antranikian, Garabed; and Gottschalk, Gerhard, 4,929,557, Cl. 435-202.000.

Gould, Ronald M.: *See—*
Wright, Bernard S.; Gould, Ronald M.; and Owen, Hartley, 4,929,780, Cl. 585-303.000.

Gozzo, Franco: *See—*
Colle, Roberto; Camaggi, Giovanni; Gozzo, Franco; Ratti, Giuseppina; Garavaglia, Carlo; and Mirenna, Luigi, 4,929,631, Cl. 514-383.000.

Grabherr, Bernd: *See—*
Schaepers, Arno; and Grabherr, Bernd, 4,929,802, Cl. 174-35.0MS.

Grabowski, David N.: *See—*
Lorence, Brian S.; Phelps, Richard A.; and Grabowski, David N., 4,928,865, Cl. 224-275.000.

Graham, Bruce L.: *See—*
Roeser, John O.; and Graham, Bruce L., 4,929,808, Cl. 200-467.000.

Graham, Scott M.; Ewing, Kenneth R.; Trackman, Marshall H.; and Darr, Duane R., to Qume Corporation. Multi-line serial printer. 4,929,099, Cl. 400-76.000.

Grahm, Isabelle. Temperature history indicatiang label. 4,929,090, Cl. 374-102.000.

Granada, Richard P.: *See—*
Elderton, Peter P.; Granada, Richard P.; and Howes, Royal E., 4,930,041, Cl. 361-190.000.

Grandon, Michael D.: *See—*
Bodai, Balazs I.; Grandon, Michael D.; Gilbert, Scott J.; Littlejohn, Douglas J.; Lemons, Kyle E.; Fellows, Richard L.; Barry, Michael R.; and Delapp, Michael D., 4,929,426, Cl. 422-63.000.

Grantham, Daniel H.: *See—*
Wiegand, Walter J.; Swindal, James L.; Swarts, Richard E.; Bullis, Robert H.; Lopiccolo, Mario T.; Grantham, Daniel H.; and Foyt, Arthur G., 4,930,042, Cl. 361-280.000.

Granzer, Ernold: *See—*
Lang, Hans-Jochen; Hropot, Max; Granzer, Ernold; and Kerekjarto, Bela, 4,929,643, Cl. 514-603.000.

Granzotto, Robert; and Wong, Wah K. J., to Arena Recreations (Toronto) Limited; and William Lawrence Heisey, A Partnership Trading as Single Play Video. One-way clutch assembly. 4,928,905, Cl. 242-201.000.

Grasser, Franz; Reichenberger, Helmut; Hassler, Dietrich; Naser, Georg; and Schmidt, Erhard, to Siemens Aktiengesellschaft. Shock-wave source having a centrally disposed ultrasound locating system. 4,928,672, Cl. 128-24.00A.

Grattan, David A.: *See—*
Reardon, Patricia A.; and Grattan, David A., 4,929,364, Cl. 210-750.000.

Gravenstein, Dietrich: *See—*
Lampotang, Samsun; Gravenstein, Dietrich; Gravenstein, Joachim S.; Gravenstein, Nikolaus; and Banner, Michael J., 4,928,687, Cl. 128-207.140.

Gravenstein, Joachim S.: *See—*
Lampotang, Samsun; Gravenstein, Dietrich; Gravenstein, Joachim S.; Gravenstein, Nikolaus; and Banner, Michael J., 4,928,687, Cl. 128-207.140.

Gravenstein, Nikolaus: *See—*
Lampotang, Samsun; Gravenstein, Dietrich; Gravenstein, Joachim S.; Gravenstein, Nikolaus; and Banner, Michael J., 4,928,687, Cl. 128-207.140.

Graves, John G. Combination plug and two-way check valve. 4,928,725, Cl. 137-269.500.

Gray, Patrick W.: *See—*
Goeddel, David V.; and Gray, Patrick W., 4,929,554, Cl. 435-172.300.

Gray, Robert E., to Cairns & Brother Inc. Closed-circuit positive pressure breathing apparatus with pneumatically operated storage chamber. 4,928,685, Cl. 128-204.240.

Gray, Roy R., to Coburn Optical Industries Inc. Apparatus for effecting rapid replacement of lens cutting tools. 4,928,433, Cl. 51-33.00W.

Great Plains Industries, Inc.: *See—*
Beaston, Brook J., 4,928,514, Cl. 73-3.000.

Green, Eric T.: *See—*
Emadi, Atahusain E.; Green, Eric T.; Margosiak, John S.; Mignogna, Daniel J.; and Smith, Dennis E., 4,929,184, Cl. 439-681.000.

Green, Stephen T.; and Van Hoye, Willibald, to Samsonite Corporation. Steering handle for luggage case. 4,928,800, Cl. 190-115.000.

Greene, Freddie W. Portable hair trimming device. 4,928,716, Cl. 132-212.000.

Greenspan, Alexander, to Superstream, Inc. Gas blower. 4,929,149, Cl. 415-99.000.

Greenspan, Jacob; and Sacco, Gasper J., to United States of America, Army. Method of diffusion bonding copper and titanium alloys to produce a projectile. 4,928,368, Cl. 29-1.220.

GRETAG Aktiengesellschaft: *See—*
Mast, Fred; and Knus, Jean A., 4,929,084, Cl. 356-446.000.

Gribbin, John D.: *See—*
Dinter, Peter; Bothe, Lothar; and Gribbin, John D., 4,929,319, Cl. 204-164.000.

Grigo, Ulrich: *See—*
Nouvertne, Werner; Gielen, Franz-Josef; Tacke, Peter; Grigo, Ulrich; Quiring, Bernd; and Lindner, Christian, 4,929,674, Cl. 325-66.000.

Grim, Tracy E., to Royce Medical Company. Soft-goods type, formable orthopaedic cast. 4,928,678, Cl. 128-90.000.

Groelinger, Howard, to Balson-Hercules Group Ltd., The. Method of treating polyester fabric. 4,929,471, Cl. 427-173.000.

Grollier, Jean F.: *See—*
Cotteret, Jean; and Grollier, Jean F., 4,929,439, Cl. 424-59.000.

Groshans, Michael J.: *See—*
Meier, Daniel A.; and Groshans, Michael J., 4,929,424, Cl. 422-9.000.

Grosselin, Jean-Michel; and Mercier, Claude, to Rhone-Poulenc Sante. Process for the preparation of unsaturated alcohols. 4,929,776, Cl. 568-862.000.

Grossi, Frank A.: *See—*
Barton, Arthur A.; DeBolt, Frederick C.; Elter, Michael R.; Fromm, Paul M.; Grossi, Frank A.; Miller, Mark T.; Rasch, Kenneth R.; and Szlucha, Thomas F., 4,929,983, Cl. 355-315.000.

Grosso, Paul V.: *See—*
Wolf, Richard A.; and Grosso, Paul V., 4,929,721, Cl. 534-885.000.

Groutas, William C., to Wichita State University, Board of Trustees of the. Latent isocynate derivatives useful for deactivating enzymes. 4,929,736, Cl. 548-341.000.

Gruber, Leopold R.: *See—*
Theurer, Josef; Oellerer, Friedrich; and Gruber, Leopold R., 4,929,816, Cl. 219-53.000.

Grumman Aerospace Corporation: *See—*
Brandstetter, Robert W., 4,929,953, Cl. 342-190.000.
Leib, Kenneth G.; and Sullivan, Edward V., 4,929,056, Cl. 350-321.000.

Grumman Corporation: *See—*
Ezzeddine, Amin K., 4,929,855, Cl. 307-571.000.

Grundler, Christoph: *See—*
Demuth, Robert; Staheli, Paul; Waber, Rene; Grundler, Christoph; and Machler, Franz, 4,928,353, Cl. 19-65.00A.

GTE Products Corporation: *See—*
Bouchard, Andre C., 4,929,868, Cl. 313-619.000.
Reddy, Vaddi B., 4,929,384, Cl. 252-301.40R.
Reddy, Vaddi B., 4,929,385, Cl. 252-301.40R.
Reddy, Vaddi B., 4,929,386, Cl. 252-301.40R.

Guala, Piergiacomo. Equipment for measuring the erythrosettling rate of blood using pipettes. 4,929,427, Cl. 422-100.000.

Guerange, Patrick: *See—*
Prus, Eric; Frene, Andre ; Bordaz, Pascal; Guerange, Patrick; and Thome, Caryl, 4,928,880, Cl. 239-8.000.

Gueret, Jean-Louis, to L'Oreal. Applicator venting arrangement. 4,929,108, Cl. 401-126.000.

Gueuret, Raymond: *See—*
Begout, Eric; Bourgeois, Alain; Gueuret, Raymond; and Lapeyre, Pascal, 4,929,962, Cl. 343-786.000.

Guezou, Jean-Pierre; and Pichard, Jacques, to L'Etat Francais. Vessel provided with at least one water jet propulsion unit. 4,929,200, Cl. 440-38.000.

Gugelmeyer, Robert J.: *See—*
Ponn, Timothy R.; Gutierrez, Mark; and Gugelmeyer, Robert J., 4,929,196, Cl. 439-620.000.

Gugenhein, Michele: *See—*
de Boisseron, Bertrand; Salvan, Michel; and Gugenhein, Michele, 4,930,124, Cl. 370-94.300.

Gugumus, Francois, to Ciba-Geigy Corporation. Polyolefins stabilized against damage caused by light. 4,929,652, Cl. 524-91.000.

Guiffary, Michel. Container of flexible material for receiving a liquid. 4,928,852, Cl. 222-107.000.

Guilbeaux, Ronald D., to Rheox, Inc. Thickened organic composition having biocidal activity and an additive for thickening and imparting biocidal activity to an organic composition. 4,929,644, Cl. 514-642.000.

Gulczynski, Zdzislaw. High accuracy reference ladder. 4,929,848, Cl. 307-246.000.

Gunderson, Roger. Integrated paint can and roller pan. 4,928,843, Cl. 220-90.000.

Guning, Horst, to Asea Brown Boveri AG. Heavy-duty circuit breaker. 4,929,856, Cl. 307-633.000.

Gunn, Timothy M.: *See—*
Simonson, Frederick, III; and Gunn, Timothy M., 4,929,314, Cl. 204-153.230.

Gupta, Balaram; and Kalyanaraman, Palaiyur S., to Hoechst Celanese Corp. Photoresist compositions based on hydroxystyrene copolymers. 4,929,537, Cl. 430-325.000.

Gupta, Ved P.; and DuPont, Louis A., to Synergistics Industries, Limited. Production of terephthalate esters by degradative transesterification of scrap or virgin terephthalate polyesters. 4,929,749, Cl. 560-79.000.

Gupta, Victor R.; and Clark, Christopher J., to Standard Oil Company, The. Process for pyrolyzing or thermal cracking a gaseous or vaporized hydrocarbon feedstock using a novel gas-solids contacting device and an oxidation catalyst. 4,929,789, Cl. 585-648.000.

Gurevich, Leon, to Cooper Industries, Inc. Method of making a wire bonded microfuse. 4,928,384, Cl. 29-623.000.

Gurit-Essex AG: *See—*
Halg, Paul; and Rohrer, Paul, 4,929,483, Cl. 428-47.000.

Gurke, Christina M.: *See*—
Bauer, Thomas M.; Dunn, Thomas A.; Gurke, Christina M.; Hopkins, John W.; and Nafziger, Richard D., 4,930,154, Cl. 379-246.000.

Gurrola, Georgina B.: *See*—
Possani, Lourival D. P.; Gurrola, Georgina B.; Bayon, Marco A. A. C.; and Sitges, Maria B., 4,929,718, Cl. 530-326.000.

Guthrie, Roderick I. L.; and Herbertson, Joseph G., to R. Guthrie Research Associates Inc. Continuous casting of thin metal strip. 4,928,748, Cl. 164-479.000.

Gutierrez, Mark: *See*—
Ponn, Timothy R.; Gutierrez, Mark; and Gugelmeyer, Robert J., 4,929,196, Cl. 439-620.000.

Gutknecht, Eva-Maria: *See*—
Fischli, Albert; Gutknecht, Eva-Maria; and Obrecht, Daniel, 4,929,741, Cl. 549-447.000.

Guzik, Andrzej T.; Curtis, James H.; Habbaba, Faris S.; and Shah, Kirit, to Motorola, Inc. Light guide for LCD. 4,929,062, Cl. 350-345.000.

Gyure, Sandor: *See*—
Sweeney, Niall; and Gyure, Sandor, 4,929,232, Cl. 604-111.000.

H. F. & Ph. F. Reemtsma GmbH & Co.: *See*—
Mentzel, Edgar; and Meixner, Ferdinand, 4,928,715, Cl. 131-365.000.

H. Novis Inc.: *See*—
McIntyre, Keith W.; and McIntyre, Scott J., 4,928,580, Cl. 98-2.100.

Haas, Juergen: *See*—
Steinwandel, Juergen; Haas, Juergen; and Plog, Carsten, 4,929,581, Cl. 502-2.000.

Haase, Roger L.: *See*—
Henry, Paul T.; Haase, Roger L.; and Fitzgibbons, Gary W., 4,928,874, Cl. 229-74.000.

Habbaba, Faris S.: *See*—
Guzik, Andrzej T.; Curtis, James H.; Habbaba, Faris S.; and Shah, Kirit, 4,929,062, Cl. 350-345.000.

Habecker, Charles N.: *See*—
Baldwin, John J.; Ponticello, Gerald S.; and Habecker, Charles N., 4,929,637, Cl. 514-445.000.

Hachisu, Mitsugu: *See*—
Shibahara, Seiji; Takahashi, Yukiko; Matsuhashi, Yuji; Hachisu, Mitsugu; Kondo, Shinichi; Takeuchi, Tomio; and Aoyagi, Takaaki, 4,929,633, Cl. 514-423.000.

Hackforth GmbH & Co., KG: *See*—
Lunke, Manfred; Falz, Ulrich; and Walter, Jurgen, 4,929,115, Cl. 403-228.000.

Hadaway, Bernard M. Method of forming a hollow fastener from sheet metal. 4,928,375, Cl. 29-509.000.

Haendler, Blanca L., to Clorox Company, The. Stable emulstified bleaching compositions. 4,929,383, Cl. 252-187.260.

Haga, Takahiro; Tsujii, Yasuhiro; Isogai, Tatsuo; Murai, Shigeo; and Tanaka, Toshihiro, to Ishihara Sangyo Kaisha Ltd. Process for producing 2-amino-4,6-dichloropyrimidine. 4,929,729, Cl. 544-330.000.

Hagan, Todd A.: *See*—
Elson, Donald E.; Gerke, Burton E., Jr.; Bitzel, Michael E.; Wilder, Bruce A.; Rodowsky, Stanley J., Jr.; Lessig, William R., III; Adams, Jeffrey S.; and Hagan, Todd A., 4,928,346, Cl. 15-338.000.

Hagedorn, Guenter E., to Nicollet Technologies, Inc. PBX voice mail interface. 4,930,153, Cl. 379-233.000.

Hagen, Susan E.: *See*—
Culbertson, Townley P.; Domagala, John M.; Hagen, Susan E.; and Sanchez, Joseph P., 4,929,613, Cl. 514-210.000.

Hagerty, James J.; and Pulsifer, David N., to ISOTEC Partners, Ltd. Glass plate fusion for macro-gradient refractive index materials. 4,929,065, Cl. 350-413.000.

Hagerty, Robert J.: *See*—
Carpenter, Larry L.; Hagerty, Robert J.; Maschmeyer, Richard O.; Morrell, Mark L.; and Schrauth, Peter A., 4,929,265, Cl. 65-64.000.

Hagewood, John F., to Du Pont de Nemours, E. I., and Company. New polyester yarns having pleasing aesthetics. 4,929,698, Cl. 528-272.000.

Hagiwara Research Corp.: *See*—
Hagiwara, Zenji; Ando, Satoshi; and Nohara, Saburo, 4,929,431, Cl. 423-328.000.

Hagiwara, Zenji; Ando, Satoshi; and Nohara, Saburo, to Hagiwara Research Corp.; and Kanebo Ltd. Process for producing amorphous aluminosilicates. 4,929,431, Cl. 423-328.000.

Hahn, Steven C., to GKN Automotive, Inc. Marine propeller drive system. 4,929,203, Cl. 440-75.000.

Hairmann, Robert S.: *See*—
Schmidt, Robert J.; and Hairmann, Robert S., 4,929,794, Cl. 585-737.000.

Hakulin, Bertel K.; and Nieminen, Jorma J., to A. Ahlstrom Corporation. Method for gasifying or combusting solid carbonaceous material. 4,929,255, Cl. 48-197.00R.

Hale, Perry: *See*—
Emmons, Stuart A.; and Hale, Perry, 4,929,377, Cl. 251-100.000.

Halenbeck, Robert; Kotha, Kriston; Cowgill, Cynthia; and Laird, Walter J., to Cetus Corporation. Production of purified, biologically active, bacterially produced recombinant human CSF-1. 4,929,700, Cl. 530-351.000.

Halg, Paul; and Rohrer, Paul, to Gurit-Essex AG. Method of reinforcing sheet metal panels, shaped plastic panels or the like and a stiffening member usable for performing the method. 4,929,483, Cl. 428-47.000.

Hall, Catherine L.: *See*—
Munford, Robert S.; and Hall, Catherine L., 4,929,604, Cl. 514-53.000.

Hall, Tamuel A.: *See*—
Lanier, Joel P.; Hall, Tamuel A.; and Moore, Kent R., 4,928,957, Cl. 272-72.000.

Haller, Bernd: *See*—
Strate, Rudiger; Schulze, Rainer; Schnatwinkel, Michael; Wagner, Georg; Wilmes, Manfred; Haller, Bernd; Herkner, Ernst; Dickmann, Jorg; and Henning, Herbert, 4,929,198, Cl. 439-709.000.

Halliar, William R.: *See*—
Yeates, Richard P.; Keating, Bruce E.; and Halliar, William R., 4,929,132, Cl. 410-56.000.

Halliburton Company: *See*—
Barrington, Burchus Q., 4,928,520, Cl. 73-151.000.
Mamke, Kevin R., 4,928,762, Cl. 166-192.000.

Halliburton Geophysical Services, Inc.: *See*—
Harrison, Earnest R., 4,928,785, Cl. 181-120.000.
Sallas, John J., 4,930,113, Cl. 367-190.000.

Halliburton Logging Services, Inc.: *See*—
Roessler, Dennis E., 4,928,764, Cl. 166-250.000.

Halperin, Henry; Tsitlik, Joshua; Weisfeldt, Myron; and Gelfand, Mark, to Johns Hopkins University, The. Cardiopulmonary resuscitation and assisted circulation system. 4,928,674, Cl. 128-30.200.

Hamada, Akihiko; Hiraoka, Hidenori; Nakamura, Yoshinobu; and Ohtsuru, Hiroshi, to Sumitomo Rubber Industries, Ltd. Rubber composition and a solid golf ball obtained therefrom. 4,929,678, Cl. 525-193.000.

Hamada, Yasuhiko: *See*—
Kato, Nobuhide; and Hamada, Yasuhiko, 4,929,331, Cl. 204-426.000.

Hamai, Kyugo: *See*—
Matayoshi, Yutaka; Yoshimura, Toru; Kamegaya, Shigeru; and Hamai, Kyugo, 4,928,650, Cl. 123-90.240.

Hamdy, Mostafa K., to University of Georgia Research Foundation, Inc. Method for rapidly fermenting alcoholic beverages. 4,929,452, Cl. 426-11.000.

Hamelin, Claude: *See*—
Holtermann, Henri; and Hamelin, Claude, 4,929,245, Cl. 604-338.000.

Hamilton, Danielle R.: *See*—
Hamilton, Gregory C.; and Hamilton, Danielle R., 4,929,862, Cl. 312-138.100.

Hamilton Fixture Company: *See*—
Overmann, John L., 4,928,832, Cl. 211-187.000.

Hamilton, Gregory C.; and Hamilton, Danielle R. Security shield for display cases. 4,929,862, Cl. 312-138.100.

Hamlin, Humphrey A. S.: *See*—
Stevenson, George F.; Foote, James C.; and Hamlin, Humphrey A. S., 4,928,682, Cl. 128-202.260.

Hammer, William E.: *See*—
Batra, Surinder P.; Hammer, William E.; Lushinsky, Gene A.; Marquart, David W.; Schwane, Walter H.; and Ziecina, Frederick J., 4,930,069, Cl. 364-200.000.

Hamner, Annabelle, executrix: *See*—
Cody, Ian A.; Hamner, Glen P., deceased; and Schorfheide, James T., 4,929,795, Cl. 585-739.000.

Hamner, Glen P., deceased: *See*—
Cody, Ian A.; Hamner, Glen P., deceased; and Schorfheide, James T., 4,929,795, Cl. 585-739.000.

Hanano, Tohru: *See*—
Kyono, Tetsuyuki; Ohnishi, Seiichiro; Hanano, Tohru; and Hotta, Tohru, 4,929,513, Cl. 428-611.000.

Hansell, Gregory L.: *See*—
Yaniv, Zvi; Cannella, Vincent D.; Hansell, Gregory L.; and Swartz, Louis D., 4,929,569, Cl. 437-51.000.

Hanselmann, Daniel; and Schlepfer, Walter, to Sulzer Brothers Limited. Method and apparatus for removal of fiber flocks from fiber bales. 4,928,354, Cl. 19-97.000.

Hansen, Godfrey L.: *See*—
Bachelder, Walter F.; Sullivan, John L.; Fiore, Peter J.; and Hansen, Godfrey L., 4,928,533, Cl. 73-838.000.

Hansen, Guenter; Schefczik, Ernst; and Reichelt, Helmut, to Basf Aktiengesellschaft. Isothiazoleazo hydroxypyridone dyes. 4,929,720, Cl. 534-766.000.

Hansen, John C.: *See*—
Moore, George G. I.; and Hansen, John C., 4,929,725, Cl. 544-87.000.

Hansen, Randall F., to United Technologies Automotive, Inc. Memory mirror control system for vehicles and the like. 4,929,878, Cl. 318-560.000.

Hansler, Richard L.: *See*—
Davenport, John M.; and Hansler, Richard L., 4,930,049, Cl. 362-32.000.

Hansmann, Johann; and Ganz, Jorg, to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H. Continuously advancing track leveling, lining and tamping machine. 4,928,599, Cl. 104-12.000.

Hanson, Gordon: *See*—
Allison, John D.; and Hanson, Gordon, 4,928,709, Cl. 128-782.000.

Hanson, Stephen R.: *See*—
Harker, Laurence A.; and Hanson, Stephen R., 4,929,602, Cl. 514-18.000.

Hanson, Violet; and Johnson, Ralph, to Hanson, Violet. Plastic bag forming machine. 4,929,224, Cl. 493-194.000.

Hanssler, Gerd: *See*—
Jelich, Klaus; Brandes, Wilhelm; Hanssler, Gerd; and Reinecke, Paul, 4,929,738, Cl. 549-76.000.
Hanwa Electronic Co., Ltd.: *See*—
Toshiyuki, Nakaie, 4,929,886, Cl. 324-691.000.
Hara, Hiroshi: *See*—
Oshikoshi, Yuji; Suganuma, Yoshimi; Hara, Hiroshi; Shiota, Kazuo; Takehara, Nobumitsu; and Sakamoto, Kiichiro, 4,928,996, Cl. 283-109.000.
Hara, Yoshimasa, to Brother Kogyo Kabushiki Kaisha. Exposure device using CRT as exposure light source. 4,929,967, Cl. 346-110.00R.
Hara, Yoshio, to Fuji Photo Film Co., Ltd. Light-tight cassette. 4,928,827, Cl. 206-416.000.
Harada, Chikao, to Colin Electronics Co., Ltd. Pulse wave detecting apparatus. 4,928,700, Cl. 128-672.000.
Harada, Chikao; and Niwa, Minoru, to Colin Electronics Co., Ltd. Method and apparatus for monitoring blood pressure. 4,928,701, Cl. 128-677.000.
Harada Kogyo Kabushiki Kaisha: *See*—
Nakase, Kazuhiko, 4,929,961, Cl. 343-715.000.
Harakawa, Yoshihiro; Takahashi, Seiya; Izawa, Koji; Takeuchi, Hidemitsu; and Ikari, Keizo, to Niksuko Corporation. Method of manufacturing organic semi-conductor solid electrolytic capacitor. 4,929,316, Cl. 204-56.100.
Harandi, Mohsen N.; and Owen, Hartley, to Mobil Oil Corp. Fluid-bed reaction process. 4,929,334, Cl. 208-91.000.
Harara, Mitsuhiko; Takizawa, Shozo; Tanaka, Tadao; and Wada, Shunichi, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha; and Mitsubishi Denki Kabushiki Kaisha. Control apparatus for a vehicular suspension system. 4,930,082, Cl. 364-424.050.
Harashima, Masakazu: *See*—
Ohno, Aritaka; Shitara, Kanji; and Harashima, Masakazu, 4,928,894, Cl. 242-7.090.
Harata, Motoo: *See*—
Suzuki, Toshitake;; Komoda, Norio; Oda, Susumu; and Harata, Motoo, 4,929,859, Cl. 310-328.000.
Harden, Donald B.: *See*—
Strekowski, Lucjan; Mokrosz, Maria; and Harden, Donald B., 4,929,726, Cl. 544-122.000.
Harder, Leroy; and Spector, George. Bike monorail system. 4,928,601, Cl. 104-53.000.
Hardt, James V., to MindCenter Corporation. EEG biofeedback method and system for training voluntary control of human EEG activity. 4,928,704, Cl. 128-732.000.
Hardt, James V.: *See*—
Henderson, Don J.; Brady, Robert; Gamble, Foster R.; Hardt, James V.; Friedfeld, Howard; Salerno, Don; Swanson, Tad; and Sansing, Maureen R., 4,928,696, Cl. 128-644.000.
Hardtke, Hans H., to Lisega GmbH. Supporting bracket for pipes. 4,928,911, Cl. 248-74.100.
Harer, Wilhelm: *See*—
Kordesch, Karl; and Harer, Wilhelm, 4,929,520, Cl. 429-94.000.
Hargis, Duane C., to Ethyl Corporation. Alkylation of aromatic amines. 4,929,764, Cl. 564-399.000.
Harigai, Noriaki: *See*—
Matsui, Fumio; Suzuki, Noboru; Takaishi, Minoru; Ogura, Ryushi; Harigai, Noriaki; Hashimoto, Tadayoshi; and Uematu, Tomoe, 4,929,494, Cl. 428-286.000.
Harju, Terho. Method for the transmission of control signals to the row drive circuits in the control of thin-film electroluminescent displays. 4,929,870, Cl. 315-169.300.
Harker, Laurence A.; and Hanson, Stephen R., to Scripps Clinic and Research Foundation. Method of inhibiting platelet dependent arterial thrombosis. 4,929,602, Cl. 514-18.000.
Harmon, Harold J., to Oklahoma State University. Conversion of dual wave beam spectrophotometer to dual wavelength spectrophotometer. 4,929,078, Cl. 356-320.000.
Harmon Industries, Inc.: *See*—
Utterback, Jeffery J.; and Mecca, Randall S., 4,928,910, Cl. 246-169.00A.
Harris Corporation: *See*—
Beasom, James D.; and O'Mara, William E., Jr., 4,929,568, Cl. 437-40.000.
Beitman, Bruce A., 4,929,566, Cl. 437-24.000.
Dharmadhikari, Vineet S., 4,929,923, Cl. 338-308.000.
Harris, Ronald B. Portable liquid-solid separator for bulk sludge. 4,929,353, Cl. 210-237.000.
Harrison, Anthony W., to Lucas Industries Public Limited Company. Brake. 4,928,797, Cl. 188-156.000.
Harrison, Earnest R., to Halliburton Geophysical Services, Inc. Full flow solenoid valve for air gun operation. 4,928,785, Cl. 181-120.000.
Harsco Corporation: *See*—
Urmson, William T., Jr.; Gaslevic, Emeric; and Junk, Ronald K., 4,928,600, Cl. 104-17.100.
Hartman, George D.; and Prugh, John D., to Merck & Co., Inc. 5-carbamoylthieno[2,3-b]thiophene-2-sulfon-amides as topically active carbonic anhydrase inhibitors. 4,929,549, Cl. 514-227.800.
Haruyama, Satoshi: *See*—
Kawakami, Shin; Haruyama, Satoshi; and Okonogi, Hirotaka, 4,929,491, Cl. 428-195.000.
Harwood, Jon W.; Karlgaard, Wayne A.; and Clegg, Michael W., to AP Parts Manufacturing Company. Process for manufacturing stamp formed mufflers. 4,928,372, Cl. 29-890.080.
Hasan, Wagar: *See*—
Tou, Frederich N.; and Hasan, Wagar, 4,930,071, Cl. 364-300.000.
Hasegawa, Makoto: *See*—
Hirayama, Takanobu; Funahashi, Hiroyuki; Yokota, Eiji; Uehara, Mitsuyoshi; Kagami, Isao; Hasegawa, Makoto; and Mizuno, Masaru, 4,929,105, Cl. 400-625.000.
Hasegawa, Mitsuyo: *See*—
Kobayashi, Kenzo; Iwagaki, Yutaka; Hasegawa, Mitsuyo; and Suganuma, Kazushi, 4,930,119, Cl. 370-16.100.
Hashimoto, Masashi: *See*—
Setoi, Hiroyuki; Kuroda, Akio; Tanaka, Hirokazu; Hirai, Hideo; Marusawa, Hiroshi; and Hashimoto, Masashi, 4,929,639, Cl. 514-452.000.
Hashimoto, Masataka: *See*—
Matsumoto, Kazuyuki; Hashimoto, Masataka; and Iwata, Michiyoshi, 4,928,556, Cl. 475-149.000.
Hashimoto, Michio: *See*—
Kurauchi, Makoto; Hashimoto, Michio; Hayasaki, Kiyoshi; Minami, Toshikazu; Ohnishi, Mutsuhiko; and Suzuki, Yohei, 4,929,650, Cl. 523-455.000.
Hashimoto, Tadayoshi: *See*—
Matsui, Fumio; Suzuki, Noboru; Takaishi, Minoru; Ogura, Ryushi; Harigai, Noriaki; Hashimoto, Tadayoshi; and Uematu, Tomoe, 4,929,494, Cl. 428-286.000.
Haslanger, Martin F.; Neustadt, Bernard R.; and Smith, Elizabeth M., to Schering Corporation. Mercapto-acylamino acid antihypertensives. 4,929,641, Cl. 514-506.000.
Hassler, Dietrich: *See*—
Grasser, Franz; Reichenberger, Helmut; Hassler, Dietrich; Naser, Georg; and Schmidt, Erhard, 4,928,672, Cl. 128-24.00A.
Hastings, Mark W.; and Buzbee, James M., to Industrial Technology, Inc. Method for locating conductive faults in telephone and similar cables. 4,929,900, Cl. 324-525.000.
Hasuly, Michael J.: *See*—
Billmers, Robert L.; Del Giudice, David M.; Tessler, Martin M.; and Hasuly, Michael J., 4,929,670, Cl. 525-54.100.
Hatakenaka, Kosuke: *See*—
Ando, Tsuyoshi; Hirono, Nakayasu; Nakao, Hirotoshi; Mito, Akio; Kihara, Kazuyuki; Hatakenaka, Kosuke; and Ogawa, Hiroshi, 4,928,730, Cl. 137-554.000.
Hatakeyama, Motonobu; Yoshimura, Kohtaroh; Naoi, Hidenori; and Wakasugi, Nobuo, to Oki Electric Industry Co., Ltd. Method for identifying coordinate data for selected locations on preprinted paper and supplying the data to a printer for printing at corresponding locations. 4,930,089, Cl. 361-519.000.
Hatanaka, Hiroshi: *See*—
Okuhara, Masakuni; Tanaka, Hirokazu; Goto, Toshio; Kino, Tohru; and Hatanaka, Hiroshi, 4,929,611, Cl. 514-183.000.
Hatanaka, Koji: *See*—
Masaka, Mitsuske; Hatanaka, Koji; Maruta, Kenji; and Okazaki, Seiji, 4,929,813, Cl. 219-270.000.
Hatch, William R.; and Foster, John W., to Lubra Sheet Corporation. Dry lubricant drilling of thru-holes in printed circuit boards. 4,929,370, Cl. 252-12.200.
Hatfield, John G., to AMP Incorporated. Apparatus for terminating a cable to a two part circular connector. 4,928,380, Cl. 29-566.300.
Hatori, Masami; Nozaki, Nobuharu; and Kamiyama, Kozi, to Fuji Photo Film Co., Ltd. Variable acoustical deflection of an optical wave in an optical waveguide. 4,929,042, Cl. 350-96.130.
Hatori, Masami, to Fuji Photo Film Co., Ltd. Light beam deflector. 4,929,043, Cl. 350-96.130.
Hattori, Kouji: *See*—
Ueda, Kenichi; Hattori, Kouji; Terada, Akihiko; and Inohara, Kazuyoshi, 4,929,934, Cl. 340-706.000.
Hattori, Yoshimasa: *See*—
Kuroda, Masami; Hattori, Yoshimasa; and Furusho, Noboru, 4,929,525, Cl. 430-75.000.
Hauser, Robert G., to Cardiac Pacemakers, Inc. Rate adaptive cardiac pacer system having living cell tissue for sensing physiologic demand. 4,928,689, Cl. 128-419.00P.
Havins, Felton H. Mounting apparatus for sonar transducer. 4,928,915, Cl. 248-288.500.
Hayakawa, Junshiro: *See*—
Watanabe, Tadahiko; Shobu, Kazuhisa; Kai, Yukio; Yamamoto, Hideki; Sudoh, Eiichi; Yagishita, Osamu; and Hayakawa, Junshiro, 4,929,417, Cl. 419-12.000.
Hayakawa Rubber Co., Ltd.: *See*—
Kimura, Tetsuya; Fujii, Toshihiro; and Nii, Hiroki, 4,929,469, Cl. 427-54.100.
Hayakawa, Teruyo: *See*—
Ishikawa, Tadashi; Tagami, Shigeru; Akimoto, Kazuo; Tsuyuki, Hiroto; Kawai, Michio; Ito, Kanji; Sato, Takayuki; Otora, Takahito; and Hayakawa, Teruyo, 4,929,977, Cl. 354-420.000.
Hayano, Kiminori, to NEC Corporation. MOS type semiconductor device potential stabilizing circuit with series MOS capacitors. 4,929,989, Cl. 357-23.600.
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Houjiyou, Yuji; Hayasaki, Hiroyuki; and Yonezawa, Kyoichi, 4,929,844, Cl. 250-561.000.
Hayasaki, Kiyoshi: *See*—
Kurauchi, Makoto; Hashimoto, Michio; Hayasaki, Kiyoshi; Minami, Toshikazu; Ohnishi, Mutsuhiko; and Suzuki, Yohei, 4,929,650, Cl. 523-455.000.
Hayasaki, Yasushi: *See*—
Kobashi, Rikizo; Takase, Shigeyuki; Enomoto, Hiroyuki; Hayasaki, Yasushi; Kobayashi, Toyohisa; and Yamazaki, Shingo, 4,929,685, Cl. 525-277.000.

Hayase, Isao; Ushiku, Kenichi; Tejima, Kunisuke; Hayashi, Seiichi; and Satoh, Kazuhiko, to Hitachi, Ltd. Variable-displacement rotary compressor. 4,929,159, Cl. 417-295.000.

Hayashi, Kenji: *See*—
Abe, Shinya; Miyamoto, Mitsuaki; Tanaka, Masayuki; Akasaka, Kozo; Hayashi, Kenji; Kawahara, Tetsuya; Katayama, Satoshi; Sakuma, Yoshinori; Suzuki, Takeshi; and Yamatsu, Isao, 4,929,623, Cl. 514-293.000.

Hayashi, Kuniharu: *See*—
Mizutani, Minoru; Kikuchi, Hiroshi; Watanabe, Shoichi; Hayashi, Kuniharu; and Maekawa, Masanori, 4,929,102, Cl. 400-248.000.

Hayashi, Seiichi: *See*—
Hayase, Isao; Ushiku, Kenichi; Tejima, Kunisuke; Hayashi, Seiichi; and Satoh, Kazuhiko, 4,929,159, Cl. 417-295.000.

Hayashi, Takahisa: *See*—
Wakimoto, Zenji; and Hayashi, Takahisa, 4,929,066, Cl. 350-415.000.

Hayashi, Yoshio; Nakamoto, Tetsuo; Kanada, Katsumi; and Kondo, Yoshikazu, to Toyo Kahan Co., Ltd. Composite polyvinylchloride plastisol coating and method of applying it to a metal sheet. 4,929,171, Cl. 427-54.100.

Hayden, Joseph S.; Sapak, David L.; and Ward, Julia M., to Schott Glass Technologies, Inc. Phosphate glass useful in high power lasers. 4,929,387, Cl. 252-301.40P.

Hays, Byron G., to BASF Corporation. Process for dispersing organic pigments with ultrasonic radiation. 4,929,279, Cl. 106-412.000.

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Mayr, Bernhard; and Lampl, Heinz, 4,928,989, Cl. 280-610.000.

Heckel, Armin: *See*—
Nickl, Josef; Heckel, Armin; Muller, Erich; Narr, Berthold; Weisenberger, Johannes; Eisert, Wolfgang; and Muller, Thomas, 4,929,754, Cl. 562-428.000.

Heffner, Thomas G.: *See*—
Coughenour, Linda L.; Davis, Robert E.; Downs, David A.; Heffner, Thomas G.; Meltzer, Leonard T.; Moos, Walter H.; Moreland, David W.; and Tecle, Haile, 4,929,734, Cl. 546-338.000.

Hegedus, Louis; Beeckman, Jean W.; Pan, Wie-Hin; and Solar, Jeffrey P., to W. R. Grace & Co.-Conn. Catalysts for selective catalytic reduction DeNOx technology. 4,929,586, Cl. 502-217.000.

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Connaughton, James M., Jr.; Sexton, James E.; and Hegener, James A., 4,929,455, Cl. 426-92.000.

Hehn, Bruce A., to Alpha Enterprises, Inc. Cassette storage container. 4,928,825, Cl. 206-387.000.

Heidjann, Franz: *See*—
Bruer, Dirk; Heidjann, Franz; and Hemker, Heinrich, 4,928,460, Cl. 56-14.600.

Heifetz, Aaron H.; Wolfe, Richard A.; Braatz, James A.; and Luthra, Narender P., to W. R. Grace & Co.-Conn. Cell growth enhancers and/or antibody production stimulators comprising chemically modified hydrophilic polyurea-urethane prepolymers and polymers. 4,929,706, Cl. 528-49.000.

Heilman, Marlin S.; Brandt, Arlan J.; Bowling, Larry D.; and Russial, Joseph F., to Lifecor, Inc. Portable device for sensing cardiac function and automatically delivering electrical therapy. 4,928,690, Cl. 128-421.000.

Heina, Karl-Fritz; Schwarz, Horst; and Weber, Wolfgang, to Maschinenbau Oppenweiler Binder GmbH & Co. Rotary sheet feeder. 4,928,953, Cl. 271-185.000.

Heinen, Hans-Dieter, to S.A. Ets. R. Heinen N.V. Device for transferring electric power. 4,929,005, Cl. 292-251.500.

Hella KG Hueck & Co.: *See*—
Diller, Friedhelm, 4,928,646, Cl. 123-376.000.

Hemker, Heinrich: *See*—
Bruer, Dirk; Heidjann, Franz; and Hemker, Heinrich, 4,928,460, Cl. 56-14.600.

Hemmes, Simon N.: *See*—
Oldenburg, Willem; Hemmes, Simon N.; and Hobbel, Jaap E., 4,929,379, Cl. 252-109.000.

Henderson, Don J.; Brady, Robert; Gamble, Foster R.; Hardt, James V.; Friedfeld, Howard; Salerno, Don; Swanson, Tad; and Sansing, Maureen R., to MindCenter Corporation. Electrode-supporting headset. 4,928,696, Cl. 128-644.000.

Henderson, Walter G.; Ellson, George A.; and Unrein, Edgar J., to Supra Products, Inc. Electronic lock system with battery conservation features. 4,929,880, Cl. 320-30.000.

Hendricks, Katherine A., to Tabakoff, Boris; and Newton, John, part interest to each. Anti-motion sickness apparatus. 4,929,228, Cl. 600-27.000.

Hendrischk, Wolfgang, to Mannesmann AG. Shiftable guide for a matrix printhead. 4,929,103, Cl. 400-124.000.

Heneger, Floyd. Electric passive pedal exerciser. 4,928,673, Cl. 128-25.00R.

Henkel Kommanditgesellschaft auf Aktien: *See*—
Veitenhansl, Rudolf; Froeschke, Wolfgang; and Piorr, Robert, 4,929,504, Cl. 428-395.000.

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Schulz, Paul; Schwadtke, Karl; and Smulders, Eduard, 4,929,380, Cl. 252-121.300.

Henning, Herbert: *See*—
Strate, Rudiger; Schulze, Rainer; Schnatwinkel, Michael; Wagner, Georg; Wilmes, Manfred; Haller, Bernd; Herkner, Ernst; Diekmann, Jorg; and Henning, Herbert, 4,929,198, Cl. 439-709.000.

Henry, Paul T.; Haase, Roger L.; and Fitzgibbons, Gary W., to Uarco Incorporated. Mailer-like business form with transparent front. 4,928,874, Cl. 229-74.000.

Henze, Christopher P.; and Mulkern, Joseph H., to Unisys Corporation. Variable resonance regulator for power supply. 4,930,063, Cl. 363-91.000.

Herbertson, Joseph G.: *See*—
Guthrie, Roderick I. L.; and Herbertson, Joseph G., 4,928,748, Cl. 164-479.000.

Herbst, Joseph A.; Owen, Hartley; and Schipper, Paul H., to Mobil Oil Corporation. Process for catalytic cracking of heavy hydrocarbon feed to lighter products. 4,929,337, Cl. 208-120.000.

Hercules Incorporated: *See*—
Cartwright, Richard V., 4,929,290, Cl. 149-35.000.
Schwark, Joanne M., 4,929,704, Cl. 528-28.000.

Herd, Karl-Josef, to Bayer Aktiengesellschaft. Process for the preparation of 3-aminophenyl 2-hydroxy-ethyl sulphone. 4,929,757, Cl. 564-423.000.

Herkner, Ernst: *See*—
Strate, Rudiger; Schulze, Rainer; Schnatwinkel, Michael; Wagner, Georg; Wilmes, Manfred; Haller, Bernd; Herkner, Ernst; Diekmann, Jorg; and Henning, Herbert, 4,929,198, Cl. 439-709.000.

Herman, Rod A.; and Kukel, Christine F., to American Cyanamid Company. Method of and bait compositions for controlling mollusks. 4,929,634, Cl. 514-426.000.

Hermann Wangner GmbH & Co. KG: *See*—
Borel, Georg, 4,928,737, Cl. 139-383.00A.

Hermans, Willem F., to Stork Amsterdam B.V. Method and apparatus for maintaining a mixture of products at a certain temperature. 4,929,152, Cl. 415-203.000.

Herrington, Ronald M.: *See*—
Nichols, Jerram B.; Hunter, Douglas; Herrington, Ronald M.; Serratelli, John F.; and Carey, David G., 4,929,646, Cl. 521-137.000.

Herzhoff, Michael: *See*—
Klinkmann, Kurt; Herzhoff, Michael; and Burmeister, Gerhard, 4,929,784, Cl. 585-422.000.

Hess, Joachim: *See*—
Hilgers, Georg; and Hess, Joachim, 4,929,727, Cl. 544-317.000.

Hesse, Michael; Hoelderich, Wolfgang; and Schwarzmann, Matthias, to BASF Aktiengesellschaft. Preparation of N-heterocycles. 4,929,733, Cl. 546-184.000.

Hewett, Richard H.; and Luscombe, Brian M., to May & Baker Limited. Herbicidal method using diflufenican. 4,929,271, Cl. 71-94.000.

Hewit, James R.: *See*—
Burdess, James S.; Fawcett, John N.; and Hewit, James R., 4,928,538, Cl. 73-862.410.

Hewlett-Packard Company: *See*—
Balazar, Leonard, 4,929,963, Cl. 346-1.100.
Berkel, Werner, 4,929,907, Cl. 330-252.000.
Chan, C. S.; Bearss, James G.; and Nelson, Terry M., 4,930,018, Cl. 358-298.000.
Natarajan, Bangalore R.; and Walmsley, Robert G., 4,929,514, Cl. 428-611.000.

Hexemer, Richard L., Jr.; Axelson, Scott R.; McCluskey, Philip H.; and Mroz, Thomas J., Jr., to Alfred University. Method for the preparation of sinterable nitrides. 4,929,433, Cl. 423-411.000.

Hibbert, David A., to General Electric Company. Thermally efficient ventilated electric busway system. 4,929,801, Cl. 174-16.200.

Hida, Hidenori: *See*—
Iino, Hideyuki; Yoshitake, Akihiro; and Hida, Hidenori, 4,929,854, Cl. 307-480.000.

Higgins, Frank P.: *See*—
Amir, Israel; and Higgins, Frank P., 4,929,845, Cl. 250-561.000.

Higgins, Kenneth B.; and Engels, Walter, to Milliken Research Corporation. Carpet tile cutting machine. 4,928,391, Cl. 30-293.000.

High Pressure Gas Safety Institute of Japan, The: *See*—
Namba, Mitsuo; and Uematsu, Reppei, 4,928,728, Cl. 137-486.000.

Higuchi, Mitsuhiro; and Yamamoto, Hirofumi, to Toto Ltd. Toilet seat structure capable of automatically feeding a seat covering peper onto a toilet seat. 4,928,325, Cl. 4-247.000.

Hijikigawa, Masaya: *See*—
Sugihara, Takashi; Uda, Kazutaka; Tabuchi, Hiroki; Inami, Yasuhiko; Hijikigawa, Masaya; and Kataoka, Shoei, 4,928,513, Cl. 73-1.00G.

Hilfiker, William K. Reinforced soil retaining wall and connector therefor. 4,929,125, Cl. 405-262.000.

Hilgers, Georg; and Hess, Joachim, to Boehringer Ingelheim KG. Improved process for precipitating cytosine from alkaline solutions with sulfuric acid. 4,929,727, Cl. 544-317.000.

Hill, Vern L.: *See*—
Lee, Anthony L.; Meyer, Howard S.; and Hill, Vern L., 4,929,585, Cl. 502-220.000.

Hillsted, Jerome, to Merit Enterprises, Inc. Ring coiling machine. 4,928,510, Cl. 72-131.000.

Hilti Aktiengesellschaft: *See*—
Bergner, Arndt, 4,929,134, Cl. 411-30.000.

Hilton, Mark D.: *See*—
McArthur, Alastair; Davis, Royston H.; Hilton, Mark D.; Newton, Trevor W.; and Patel, Dinesh M., 4,929,628, Cl. 514-364.000.

Himmele, Walter; Bott, Kaspar; and Bronstert, Klaus, to BASF Aktiengesellschaft. Preparation of 1-aryl-1-alkenes. 4,929,786, Cl. 585-469.000.

Hinnen, Hans R.; and Marelin, Miklos B., to Idex, Inc. Tool for tightening cable ties. 4,928,738, Cl. 140-93.400.

Hintsa, Roy A. Panel fastener. 4,928,467, Cl. 52-511.000.

Hirai, Hideo: *See*—
Setoi, Hiroyuki; Kuroda, Akio; Tanaka, Hirokazu; Hirai, Hideo; Marusawa, Hiroshi; and Hashimoto, Masashi, 4,929,639, Cl. 514-452.000.
Hirai, Yasuhiko: *See*—
Nishimura, Masakatsu; Okada, Naoya; Murata, Yasuo; and Hirai, Yasuhiko, 4,929,317, Cl. 204-59.00R.
Hiramatsu, Tohru; Tami, Kazuya; and Ohchi, Torao, to Tokyo Juki Industrial Co., Ltd. Automatic sewing machine exclusively used for sewing zipper on workpiece. 4,928,612, Cl. 112-257.000.
Hirano, Takashi: *See*—
Suwa, Toshio; Kobayashi, Nobuaki; and Hirano, Takashi, 4,928,605, Cl. 110-261.000.
Hiraoka, Hidenori: *See*—
Hamada, Akihiko; Hiraoka, Hidenori; Nakamura, Yoshinobu; and Ohtsuru, Hiroshi, 4,929,678, Cl. 525-193.000.
Hirata Industrial Machineries Co., Ltd.: *See*—
Nakayama, Takahide, 4,929,827, Cl. 250-223.00R.
Hirata, Masahiro: *See*—
Mito, Kazunori; and Hirata, Masahiro, 4,929,817, Cl. 219-544.000.
Hirayama, Takanobu; Funahashi, Hiroyuki; Yokota, Eiji; Uehara, Mitsuyoshi; Kagami, Isao; Hasegawa, Makoto; and Mizuno, Masaru, to Brother Kogyo Kabushiki Kaisha. Paper feeding apparatus for printer. 4,929,105, Cl. 400-625.000.
Hirbod, Modjtaba, to ABB Stal AB. Method for surface treatment of metal alloys. 4,929,287, Cl. 148-276.000.
Hirofuji, Satoshi: *See*—
Moritani, Tohei; Oda, Hidemasa; Sato, Toshiaki; Negi, Taichi; Matsumura, Keiji; Kawai, Syuji; Tanaka, Nobuo; and Hirofuji, Satoshi, 4,929,482, Cl. 428-36.400.
Hiroi, Masakazu: *See*—
Uto, Nobutaka; Shido, Hironori; Saito, Jun; Hiroi, Masakazu; Kobayashi, Kenji; Murakami, Koichi; and Naito, Masataka, 4,928,941, Cl. 270-53.000.
Hirono, Nakayasu: *See*—
Ando, Tsuyoshi; Hirono, Nakayasu; Nakao, Hirotoshi; Mito, Akio; Kihara, Kazuyuki; Hatakenaka, Kosuke; and Ogawa, Hiroshi, 4,928,730, Cl. 137-554.000.
Hirose, Takeshi: *See*—
Furutachi, Nobuo; and Hirose, Takeshi, 4,929,540, Cl. 430-555.000.
Hirose, Yukimi: *See*—
Nakamura, Nobuaki; Hirose, Yukimi; Kai, Masakatsu; and Itonaga, Makoto, 4,929,822, Cl. 250-201.400.
Hirota, Kozo: *See*—
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Hirota, Mitugu: *See*—
Kanda, Shuhei; Hirota, Mitugu; and Narushima, Teruo, 4,930,024, Cl. 360-10.100.
Hirschfeld, Tomas B., to University of California, Regents of the. Absorption-emission optrode and methods of use thereof. 4,929,561, Cl. 436-116.000.
Hitachi, Ltd.: *See*—
Aoki, Masakazu; and Suzuki, Akira, 4,929,161, Cl. 418-83.000.
Arimoto, Akira; Ishikawa, Sachiko; and Kataoka, Keiji, 4,929,044, Cl. 350-96.130.
Hayase, Isao; Ushiku, Kenichi; Tejima, Kunisuke; Hayashi, Seiichi; and Satoh, Kazuhiko, 4,929,159, Cl. 417-295.000.
Matsuo, Teruo; Ihara, Tadayoshi; and Oyamada, Yoshinori, 4,929,209, Cl. 445-6.000.
Nakagawa, Norio; Takagi, Katsuaki; and Aoki, Hirokazu, 4,930,104, Cl. 365-49.000.
Suzuki, Shuuji; Moriyama, Kenzo; and Sueoka, Yuuji, 4,930,128, Cl. 371-12.000.
Takahashi, Yasuhiro; and Takada, Osamu, 4,930,122, Cl. 370-85.150.
Takenaka, Takaji; Netsu, Tositada; Shigi, Hidetaka; and Yamamoto, Masakazu, 4,930,002, Cl. 357-75.000.
Tanaka, Hitoshi; Hori, Ryoichi; Itoh, Kiyoo; Kimura, Katsutaka; and Shimohigashi, Katsuhiro, 4,930,112, Cl. 365-226.000.
Yabusaki, Masao; Yamamoto, Etsuji; Takeuchi, Hiroyuki; and Kohno, Hideki, 4,929,881, Cl. 324-318.000.
Hitachi Maxell, Ltd.: *See*—
Fujiwara, Hideo; Tottori, Takeshi; Inagoya, Osamu; and Mikami, Hirosuke, 4,928,382, Cl. 29-603.000.
Hitachi Medical Corporation: *See*—
Yabusaki, Masao; Yamamoto, Etsuji; Takeuchi, Hiroyuki; and Kohno, Hideki, 4,929,881, Cl. 324-318.000.
Hitachi Metals, Ltd.: *See*—
Masaka, Mitusuke; Hatanaka, Koji; Maruta, Kenji; and Okazaki, Seiji, 4,929,813, Cl. 219-270.000.
Hitachi VLSI Engineering Corporation: *See*—
Tanaka, Hitoshi; Hori, Ryoichi; Itoh, Kiyoo; Kimura, Katsutaka; and Shimohigashi, Katsuhiro, 4,930,112, Cl. 365-226.000.
Hoashi, Akira; Akima, Hideo; Shimanuki, Haruki; and Matsubara, Yuji, to Fujitsu Limited. Anti-skid brake control system. 4,930,083, Cl. 364-426.020.
Hobbel, Jaap E.: *See*—
Oldenburg, Willem; Hemmes, Simon N.; and Hobbel, Jaap E., 4,929,379, Cl. 252-109.000.
Hochiki Corp.: *See*—
Yuchi, Sadataka; Machida, Haruchika; Matsuoka, Naoya; and Kikuchi, Masamichi, 4,930,095, Cl. 364-571.010.
Hodapp, Donald: *See*—
Bejarano-Wallens, Celso O.; Gage, Julie E.; and Hodapp, Donald, 4,929,456, Cl. 426-99.000.
Hodel, P. Lloyd; and Atkins, Paul V., to Dalmo Victor, Inc. High precision radar detection system and method. 4,929,958, Cl. 342-432.000.
Hoeberechts, Arthur M. E.; and Peters, Petrus J. M., to U.S. Philips Corporation. Combination of a support and a semiconductor body and method of manufacturing such a combination. 4,929,999, Cl. 357-68.000.
Hoechst Aktiengesellschaft: *See*—
Dinter, Peter; Bothe, Lothar; and Gribbin, John D., 4,929,319, Cl. 204-164.000.
Lang, Hans-Jochen; Hropot, Max; Granzer, Ernold; and Kerekjarto, Bela, 4,929,643, Cl. 514-603.000.
Payer, Wolfgang; Buhnen, Heinz D.; and Zoller, Wilhelm, 4,928,720, Cl. 137-13.000.
Stephani, Trutz-Ulrich; Mohr, Dieter; Maisel, Britta; and Frass, Werner, 4,929,534, Cl. 430-191.000.
Hoechst Celanese Corporation: *See*—
Anderson, Norman S.; Promislow, Albert L.; Rayborn, Randy L.; and Vukov, Rastko, 4,929,769, Cl. 568-614.000.
Aslam, Mohammad; Vicari, Richard; and Davenport, Kenneth G., 4,929,694, Cl. 526-262.000.
DeMartino, Ronald N.; East, Anthony J.; and Calundann, Gordon W., 4,929,696, Cl. 526-312.000.
Dunder, Thomas A., 4,929,532, Cl. 430-143.000.
Golder, Michael D., 4,929,656, Cl. 524-195.000.
Gupta, Balaram; and Kalyanaraman, Palaiyur S., 4,929,537, Cl. 430-325.000.
Kohn, Rachel S., 4,929,405, Cl. 264-41.000.
Ryan, Debra A., 4,929,773, Cl. 568-814.000.
Spak, Mark A.; Mammato, Donald; Durham, Dana; and Jain, Sangya, 4,929,536, Cl. 430-325.000.
Hoechst-Roussel Pharmaceuticals, Inc.: *See*—
Allen, Richard C.; and Wettlaufer, David G., 4,929,622, Cl. 514-281.000.
Glamkowski, Edward J.; and Kurys, Barbara E., 4,929,615, Cl. 514-219.000.
Hoelderich, Wolfgang: *See*—
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Smuda, Hubert; Hoelderich, Wolfgang; Goetz, Norbert; and Recker, Hans-Gert, 4,929,765, Cl. 568-427.000.
Taglieber, Volker; Hoelderich, Wolfgang; Kummer, Rudolf; Mross, Wolf D.; and Saladin, Guenter, 4,929,758, Cl. 564-485.000.
Taglieber, Volker; Hoelderich, Wolfgang; Kummer, Rudolf; Mross, Wolf D.; and Saladin, Guenter, 4,929,759, Cl. 564-485.000.
Hoenk, Michael E.: *See*—
Vahala, Kerry J.; and Hoenk, Michael E., 4,929,041, Cl. 350-96.100.
Hoerner, Clinton C., Jr.: *See*—
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Hoffman-La Roche Inc.: *See*—
Fischli, Albert; Gutknecht, Eva-Maria; and Obrecht, Daniel, 4,929,741, Cl. 549-447.000.
Hoffmann-La Roche Inc.: *See*—
Batcho, Andrew D.; Horst, Ronald L.; and Uskokovic, Milan R., 4,929,609, Cl. 514-167.000.
Meier, Werner; Rambeck, Walter A.; Weiser, Harald; and Zucker, Hermann, 4,929,610, Cl. 514-167.000.
Hofler, Siegfried: *See*—
Kusserow, Bernd; Gagneur, Klaus; and Hofler, Siegfried, 4,930,034, Cl. 361-19.000.
Hofman, Arie A.: *See*—
Steenbergen, Bastiaan G.; Hofman, Arie A.; and De Waard, Willem, 4,929,126, Cl. 405-267.000.
Hofmann Werkstatt-Technik GmbH: *See*—
Lulay, Eugen, 4,928,548, Cl. 74-573.00F.
Hofmeister, Peter: *See*—
Leyendecker, Joachim; Buerstinghaus, Rainer; Theobald, Hans; Kuenast, Christoph; and Hofmeister, Peter, 4,929,617, Cl. 514-252.000.
Hogenmuller, Roger; Chauvel, Bernard; and Daniel, Jean-Claude, to Rhone-Poulenc Chimie. Process for the preparation of polymer particles possessing, implanted on their surface, amphophilic molecules carrying ion-forming or reactive groups, and a process for the preparation of a latex comprising these particles. 4,929,662, Cl. 524-376.000.
Holcombe, Thomas C.; Sager, Thomas C.; Volles, Warren K.; and Zarchy, Andrew S., to UOP. Isomerization process. 4,929,799, Cl. 585-737.000.
Hollander, David S.; and Rubenstein, Mark S. Apparatus for packaging refrigerated goods. 4,928,847, Cl. 220-408.000.
Hollweck, Walter, to Inter Control Hermann Kohler Elektrik GmbH. Temperature safety device for electric devices. 4,929,922, Cl. 337-407.000.
Holmberg, Goran I., to Basics Corporation. Portable data system. 4,929,948, Cl. 340-407.000.
Holoubek, Andrew J.: *See*—
McCann, Gerald P.; and Holoubek, Andrew J., 4,928,854, Cl. 222-129.100.
Holroyd, Eric; and Wright, Anthony R., to Apsley Metals Limited. Method for the manufacture of a pneumatic tire. 4,929,292, Cl. 156-132.000.
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Agren, Lennart; and Holso, Eino, 4,929,409, Cl. 264-508.000.

Holtermann, Henri; and Hamelin, Claude, to Laboratoires Biotrol. Safety device for ostomy bag coupling system. 4,929,245, Cl. 604-338.000.

Home Security Systems, Inc.: *See*—
Friedman, Don; and Chang, Thomas T., 4,929,936, Cl. 340-715.000.

Honda Giken Kabushiki Kaisha: *See*—
Muroya, Fumio; and Kotani, Yoshiaki, 4,928,458, Cl. 56-11.800.

Honda Giken Kogyo: *See*—
Noguchi, Hiroyuki; and Yamada, Ichiho, 4,928,385, Cl. 29-788.000.

Honda Giken Kogyo K.K.: *See*—
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Honda Giken Kogyo Kabushiki Kaisha: *See*—
Hosaka, Takefumi; Arai, Yasuhisa; and Matsui, Hiroki, 4,930,084, Cl. 364-426.040.
Iwagawa, Yoshihiro; Yahagi, Toshio; and Fujii, Etsuo, 4,929,036, Cl. 303-115.000.
Kawano, Shizuo, 4,928,781, Cl. 180-227.000.
Kita, Tetsuo, 4,928,334, Cl. 5-191.000.
Niizato, Tomonori; Tanai, Tsuneo; Kasahara, Kazuhiro; Saka, Tsutomu; and Oikawa, Toshihiro, 4,928,641, Cl. 123-90.160.
Otsubo, Kazumi, 4,929,805, Cl. 200-61.45R.

Honda, Tsunetoshi: *See*—
Furutaka, Yasuhisa; Aoyama, Hirokazu; and Honda, Tsunetoshi, 4,929,318, Cl. 204-157.600.

Honeywell Inc.: *See*—
Anderson, Edmund J.; and Desrude, Wayne P., 4,928,806, Cl. 198-345.000.
Durand, William W.; and Peterson, Ronald E., 4,929,063, Cl. 350-353.000.
Gifford, David R., 4,929,995, Cl. 357-34.000.
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Nichols, Dwight E., 4,928,922, Cl. 251-180.000.

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Bauer, Thomas M.; Dunn, Thomas A.; Gurke, Christina M.; Hopkins, John W.; and Nafziger, Richard D., 4,930,154, Cl. 379-246.000.

Hopmann, Mark E., to Baker Hughes Incorporated. Method and apparatus for shifting a ported member using continuous tubing. 4,928,772, Cl. 166-386.000.

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Tanaka, Hitoshi; Hori, Ryoichi; Itoh, Kiyoo; Kimura, Katsutaka; and Shimohigashi, Katsuhiro, 4,930,112, Cl. 365-226.000.

Horie, Haruo: *See*—
Horie, Mitsukazu; Horie, Shigemitsu; and Horie, Haruo, 4,928,444, Cl. 52-66.000.

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Horii, Shigeo, to Reiko Co., Ltd. Balloon made of metal vapor deposited film. 4,928,908, Cl. 244-31.000.

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Kaufmann, John W.; Swidwa, Kenneth J.; and Hornak, Leonard P., 4,929,413, Cl. 376-268.000.

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Sekiguchi, Shigemi, 4,929,189, Cl. 439-352.000.

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Ohmura, Yukihiro; Kobayashi, Yoshiyuki; Hosoi, Keiji; and Shimoda, Kazuharu, 4,928,659, Cl. 123-588.000.

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Takakusaki, Nobuyuki; Mizutani, Yohji; Kishida, Nobuhiro; and Hosokawa, Manabu, 4,929,450, Cl. 425-526.000.

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Kyono, Tetsuyuki; Ohnishi, Seiichiro; Hanano, Tohru; and Hotta, Tohru, 4,929,513, Cl. 428-611.000.

Houjiyou, Yuji; Hayasaki, Hiroyuki; and Yonezawa, Kyoichi, to Sanyo Electric Co., Ltd. Apparatus for detecting the presence and size of a document. 4,929,844, Cl. 250-561.000.

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Elderton, Peter P.; Granada, Richard P.; and Howes, Royal E., 4,930,041, Cl. 361-190.000.

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Slaugh, Lynn H.; Johnson, Thomas H.; and Hoxmeier, Ronald J., 4,929,584, Cl. 502-112.000.

Hropot, Max: *See*—
Lang, Hans-Jochen; Hropot, Max; Granzer, Ernold; and Kerekjarto, Bela, 4,929,643, Cl. 514-603.000.

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Barer, Sol J.; Maxwell, Peter C.; and Hsieh, Jih-Han, 4,929,396, Cl. 562-595.000.

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Hsu, Hsiung, to Ohio State University, The. Non-contact high frequency tonometer. 4,928,697, Cl. 128-649.000.

Hu, Lee-Ping, to Hydrotek Corporation. Fluid faucet. 4,928,732, Cl. 137-607.000.

Huang, C. S. Warren; and Meyer, Karl W., to Ethyl Corporation. Process for separating 1-dodecene and 1-tetradecene from an aluminum alkyl chain growth product. 4,929,788, Cl. 585-522.000.

Huang, Shu-Jen W.: *See*—
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Hubbard, Dean A.: *See*—
Link, Donald A.; Hubbard, Dean A.; and Larsen, Michael R., 4,929,919, Cl. 335-38.000.

Huber, Joel E.: *See*—
VanRheenen, Verlan H.; and Huber, Joel E., 4,929,395, Cl. 540-4.000.

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Huff, Darrel: *See*—
Connelly, James D.; and Huff, Darrel, 4,928,551, Cl. 74-606.00R.

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Stephenson, James G.; and Huggett, Mark D., 4,930,056, Cl. 362-364.000.

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Hughes Aircraft Company: *See*—
Castelaz, Patrick F., 4,930,099, Cl. 364-820.000.
Chang, David B., 4,929,841, Cl. 250-504.00R.
La Plante, John A.; and Schaefer, Robert D., 4,929,073, Cl. 350-609.000.
Larsen, Alan B., 4,929,892, Cl. 324-158.00F.
Lee, Jar J.; and Yen, Huan-Wun, 4,929,956, Cl. 342-376.000.
Sato, Robert N., 4,929,913, Cl. 330-308.000.
Small, James G., 4,929,951, Cl. 342-179.000.
Williams, Ronald L., 4,930,001, Cl. 357-71.000.

Hughes, Joel J., to Container Products Corp. Decontamination booth. 4,928,440, Cl. 51-426.000.

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Ogden, Ralph; and Huik, Heikki, 4,928,332, Cl. 5-68.000.

Huisen, Andre , to Wild Leitz AG. Interferometric range finder. 4,929,077, Cl. 356-4.500.

Huizenga, Lee M. Storage organizer system and means for installing the same. 4,928,833, Cl. 211-187.000.

Hull, Charles W., to 3D Systems, Inc. Method for production of three-dimensional objects by stereolithography. 4,929,402, Cl. 264-22.000.

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Hultberg, Jimmy, to AB Volvo. Conveyor. 4,928,810, Cl. 198-699.100.

Hultåker, Eric, to AB Aros Avancerad Butikskontroll. Magnetized ink, paint or dye used on merchandise to prevent theft. 4,929,928, Cl. 340-572.000.
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Tyers, Michael B.; Coates, Jan H.; Humber, David C.; Ewan, George B.; and Bell, James A., 4,929,632, Cl. 514-397.000.
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Chan, Yiu-Fai; and Hung, Chuan-Yung, 4,930,107, Cl. 365-189.080.
Hung, William M.; and Su, Kai C., to Ciba-Geigy Corporation. Ultraviolet absorbing lenses and method of making the same. 4,929,250, Cl. 8-507.000.
Hunger, Walter. Hydraulically-operated support device for semitrailers. 4,928,488, Cl. 60-480.000.
Hunger, Walter. Fifth wheel coupling. 4,928,987, Cl. 280-435.000.
Hungerman, Eric R.: *See*—
Danby, Philip C.; Danby, Hal C.; and Hungerman, Eric R., 4,929,329, Cl. 204-299.00R.
Hunter, Douglas: *See*—
Nichols, Jerram B.; Hunter, Douglas; Herrington, Ronald M.; Serratelli, John F.; and Carey, David G., 4,929,646, Cl. 521-137.000.
Hunter Douglas International N.V.: *See*—
de Jong, Hendrikus, 4,929,475, Cl. 427-407.100.
Oskam, Herman, 4,928,744, Cl. 160-178.100.
Hunter, James R.: *See*—
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DiSimone, John; Brown, Paul; and Huntington, Christopher, 4,929,166, Cl. 425-190.000.
Hussain, Saadat, to Ethyl Corporation. Process for preparing brominated pentaerythritols. 4,929,775, Cl. 568-844.000.
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Hussmann, Gregory P.; and Udovich, Carl A., to Amoco Corporation. Preparation of substituted benzophenones. 4,929,761, Cl. 568-319.000.
Hutchinson, Wilbur P. Eccentric "Z" fold mailer with nesting capabilities. 4,928,875, Cl. 229-92.100.
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Torbus, Marek; Jerman, Franz; Ladegourdie, Gerard; Lingemann, Dirk; Seiss, Willi; and Vujevic, Aleksandar, 4,929,649, Cl. 523-145.000.
Hutter, Louis N., to Texas Instruments Incorporated. Trench bipolar transistor. 4,929,996, Cl. 357-34.000.
Hutter, Robert J.: *See*—
Steele, Duane F.; Warman, Eugene C.; and Hutter, Robert J., 4,929,157, Cl. 417-312.000.
Huyer, Johannes N., to Vermeulen-Hollandia Octrooien II B.V. Crank device. 4,928,547, Cl. 74-545.000.
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Landriault, L. Steven; Ortloff, Donald J.; and Bollfrass, Charles A., 4,928,999, Cl. 285-113.000.
Hydrotek Corporation: *See*—
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Suzuki, Akinori; Hyeon, Suong B.; Kajita, Toshio; Furushima, Masakazu; Yoshinaka, Shigeo; Suzuki, Takashi; Oda, Mitsunori; and Tanaka, Akinori, 4,929,267, Cl. 71-77.000.
Hyogo, Yukihiro; and Kurihara, Akio, to Yazaki Corporation. Mounting construction for on-vehicle electrical connection apparatus. 4,929,182, Cl. 439-34.000.
Hyson, Michael T.: *See*—
Rembaum, Alan; Rhim, Won-Kyu; Hyson, Michael T.; and Chang, Manchium, 4,929,400, Cl. 264-10.000.
Ibsen, Lars S., to A/S Alfred Benzon. Oral composition containing particles comprising an active substance. 4,929,448, Cl. 424-489.000.
Ichimura, Kiyoshi: *See*—
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Ichino, Kouji, to Kaijo Denki Co. Ltd. Socket structure for mounting ultrasonic gas flow measuring device with respect to gas flow pipe. 4,928,534, Cl. 73-861.180.
ICI Australia Operations Proprietary Limited: *See*—
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Ida, Yuichi: *See*—
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Idex, Inc.: *See*—
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Iehisa, Nobuaki: *See*—
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Iguchi, Masaaki: *See*—
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Ihara, Tadayoshi: *See*—
Matsuo, Teruo; Ihara, Tadayoshi; and Oyamada, Yoshinori, 4,929,209, Cl. 445-6.000.
Iida, Kazuyoshi: *See*—
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Iino, Hideyuki; Yoshitake, Akihiro; and Hida, Hidenori, to Fujitsu Limited; and Fujitsu Microcomputer Systems Limited. Clock circuit having a clocked output buffer. 4,929,854, Cl. 307-480.000.
Ikari, Keizo: *See*—
Harakawa, Yoshihiro; Takahashi, Seiya; Izawa, Koji; Takeuchi, Hidemitsu; and Ikari, Keizo, 4,929,316, Cl. 204-56.100.
Ikeda, Masahiro: *See*—
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Ikeda, Masami: *See*—
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Ikeda, Yasuhiko, to NIFCO, Inc. Buckle. 4,928,364, Cl. 24-614.000.
Ikenaga, Yasunori, to Sharp Kabushiki Kaisha. Ink cartridge. 4,929,109, Cl. 101-134.000.
Iltis, Alain; and Maestro, Patrick, to Rhone-Poulenc Chimie. Electromagnetic wave absorbers comprised of barium titanate powders. 4,929,574, Cl. 501-137.000.
Imai, Masaaki; and Uemura, Minoru, to Sasakura Engineering Co., Ltd. Concentrating apparatus with reverse osmosis membrane. 4,929,347, Cl. 210-101.000.
Imaizumi, Tomoaki: *See*—
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Imamura, Kaoru, to Kabushiki Kaisha Toshiba. Trimming process by a laser beam. 4,928,838, Cl. 219-121.690.
Imamura, Naoya: *See*—
Kitayama, Shinichiro; Adachi, Teruho; Ueda, Masahiro; Aoki, Yuichi; Shiiki, Satoshi; Takigawa, Akio; Yoshida, Motoaki; Imamura, Naoya; Maeda, Koichi; and Kayanoki, Hisayuki, 4,929,523, Cl. 430-4.000.
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Silvestrini, Jesus A., 4,929,459, Cl. 426-399.000.
Impact International Pty, Ltd.: *See*—
Lajovic, Dusan S., 4,928,877, Cl. 229-125.420.
Impact Systems, Inc.: *See*—
Typpo, Pekka M., 4,929,895, Cl. 324-231.000.
Imperial Chemical Industries plc: *See*—
Byrom, David, 4,929,550, Cl. 435-101.000.
Tury, Bernard, 4,929,369, Cl. 252-12.000.
Imura, Yoshio; and Takahashi, Tsugio, to Nikon Corporation. Camera and image output apparatus capable of trimmed photographing. 4,929,971, Cl. 354-75.000.
Inaba, Yoshiharu; Mitoguchi, Fumio; and Yamashita, Hiromasa. Direct-pressure mold clamping mechanism. 4,929,165, Cl. 425-150.000.
Inada, Eiichi: *See*—
Kitagawa, Kazuo; Komatsu, Fumiaki; Masaki, Takayoshi; Sawada, Yoshihisa; and Inada, Eiichi, 4,929,394, Cl. 252-633.000.
Inagaki, Yoshio: *See*—
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Inagoya, Osamu: *See*—
Fujiwara, Hideo; Tottori, Takeshi; Inagoya, Osamu; and Mikami, Hirosuke, 4,928,382, Cl. 29-603.000.
Inami, Yasuhiko: *See*—
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Inata, Tsuguo: *See*—
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Industrial Energy Corporation: *See*—
Paull, James B., 4,928,749, Cl. 165-1.000.
Industrial Technology, Inc.: *See*—
Hastings, Mark W.; and Buzbee, James M., 4,929,900, Cl. 324-525.000.
Inman Mold Manufacturing Co., Inc.: *See*—
Barlics, John J.; and Barlics, Glen D., 4,928,881, Cl. 239-44.000.
Inoda, Masahiro: *See*—
Yazawa, Hiromi; Inoda, Masahiro; and Kimura, Hideaki, 4,930,016, Cl. 358-296.000.
Inohara, Kazuyoshi: *See*—
Ueda, Kenichi; Hattori, Kouji; Terada, Akihiko; and Inohara, Kazuyoshi, 4,929,934, Cl. 340-706.000.
Inomata, Teruhisa: *See*—
Murata, Hiroaki; Inomata, Teruhisa; and Tabira, Masatoshi, 4,929,866, Cl. 313-500.000.
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Takata, Hirotoshi; Suruga, Eihiro; and Inoue, Gentei, 4,929,098, Cl. 384-450.000.
Inoue, Kazuo; Kishi, Noriyuki; and Akiyama, Eitetsu, to Honda Giken Kogyo K.K. Supercharging pressure control method for turbocharged internal combustion engines. 4,928,489, Cl. 60-602.000.

Inoue, Kiyoshi: *See*—
Akanuma, Hideo; Murata, Masashi; Inoue, Kiyoshi; and Ohgake, Ryoji, 4,929,372, Cl. 252-29.000.
Inoue, Toshinobu, to Kabushiki Kaisha Toshiba. Scroll compressor having exhausting pipe pressed into muffler chamber under pressure. 4,929,160, Cl. 418-55.000.
Inoue, Toshio; Mine, Takayuki; Izutsu, Hitoshi; Yamaguchi, Toshihide; Kobata, Fumihiro; and Kawabata, Juheiji, to Dainippon Ink and Chemicals, Inc. Thermoplastic resin composition. 4,929,665, Cl. 524-500.000.
Institut Fancais du Petrole: *See*—
Meynier, Patrick, 4,928,784, Cl. 181-106.000.
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Cameron, Charles; Mimoun, Hubert; Bonnaudet, Serge; and Robine, Alain, 4,929,787, Cl. 585-500.000.
Wittrisch, Christian, 4,929,915, Cl. 324-347.000.
Integrated Tech Systems, Inc.: *See*—
Lucas, Gary H., 4,928,889, Cl. 239-751.000.
Intel Corporation: *See*—
Allen, Michael J., 4,930,098, Cl. 364-716.000.
Ledenbach, Gregory W.; and Allen, Michael J., 4,930,097, Cl. 364-716.000.
IntelliCorp, Inc.: *See*—
Tou, Frederich N.; and Hasan, Wagar, 4,930,071, Cl. 364-300.000.
Intelligent Technologies Corporation: *See*—
Golicz, Roman M., 4,928,944, Cl. 271-6.000.
Inter Control Hermann Kohler Elektrik GmbH: *See*—
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Interdibipack S.p.A.: *See*—
Di Bernardo, Pietro, 4,928,829, Cl. 206-524.800.
International Baler Corp.: *See*—
Keesey, Charles R.; and Flood, Ted C., 4,929,141, Cl. 414-412.000.
International Business Machines Corporation: *See*—
Ainoya, Masayuki; Ishihara, Takeyuki; Kanno, Tesuo; Kikuchi, Takahiro; Mori, Seiichi; Nobumori, Shogo; and Shirakawa, Junji, 4,929,982, Cl. 355-311.000.
Batra, Surinder P.; Hammer, William E.; Lushinsky, Gene A.; Marquart, David W.; Schwane, Walter H.; and Ziecina, Frederick J., 4,930,069, Cl. 364-200.000.
Beechko, Nicholas, 4,929,301, Cl. 156-657.000.
Chung, Paul W.; Gee, Ralph L.; Lang, Luke C. K.; and Saber, Paik, 4,929,918, Cl. 331-10.000.
Cina, Vincent J., Jr., 4,930,073, Cl. 364-300.000.
Franaszek, Peter A.; and Georgiou, Christos J., 4,929,940, Cl. 340-825.020.
Kravitz, Jeffrey K.; and Palmer, Charles C., 4,930,159, Cl. 380-23.000.
Patterson, William A.; Tong, Dien H.; and Wooden, James R., 4,929,100, Cl. 400-124.000.
Varma, Anujan M.; and Georgiou, Christos J., 4,929,939, Cl. 340-825.800.
International Fuel Cells Corp.: *See*—
Luoma, Warren L.; Martin, Ronald G.; and Breault, Richard D., 4,929,517, Cl. 429-34.000.
International Paper Company: *See*—
Gibbons, Charles E.; Marano, Gerald A.; Kittrell, James M.; Whitlock, Allan A.; Lanham, Robert L.; and Evans, Donald, 4,929,476, Cl. 428-34.200.
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Marquez, Edmundo M.; Nowak, Jean-Francois; and Robles, Antonio, 4,929,473, Cl. 427-252.000.
Inui, Koichi, to Sharp Kabushiki Kaisha. Laser printer. 4,929,970, Cl. 346-160.000.
Inuksi, Yuzo; and Nakayama, Mitsuyuki, to Fuji Photo Film Co., Ltd. Method and apparatus for preventing pulsations in a flowing fluid. 4,928,719, Cl. 137-1.000.
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Gassman, Max P.; Larson, David J.; and Trampel, Darrell W., 4,928,628, Cl. 119-1.000.
Huebner, Patrick H.; Sebranek, Joseph G.; Olson, Dennis G.; and Anderson, Eugene A., 4,928,892, Cl. 241-82.500.
Kostic, Nenad M.; and Zhou, Xia-Ying, 4,929,091, Cl. 374-162.000.
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Irick, Gether, Jr.; Mercer, Patricia N.; and Simmons, Kenneth E., to Eastman Kodak Company. Catalyst compositions and the use thereof in the hydrogenation of carboxylic acid esters. 4,929,777, Cl. 568-864.000.
Isaacson, Manfred A. Emergency spare wheel and method and apparatus for installing same. 4,929,032, Cl. 301-38.00R.
Isbert, Jacques: *See*—
Delfour, Andre ; Falempin, Francois; Isbert, Jacques; and Sans, Claude, 4,929,079, Cl. 356-336.000.
ISG/AG: *See*—
Larsson, Karl O. A. H., 4,929,229, Cl. 604-74.000.
Isham, William R.; Cragun, E. Brent; Gault, Christopher; and Wermeling, William J., to Fountain Fresh, Inc. End aisle fluid mixing and dispensing system. 4,928,853, Cl. 222-108.000.
Ishigami, Toshihiko: *See*—
Yonezawa, Akihiro; Sasaki, Hiroki; Mitsuyuki, Yoichiro; Mori, Yasuki; and Ishigami, Toshihiko, 4,929,869, Cl. 313-639.000.
Ishihara, Noriyuki: *See*—
Shishido, Kihachi; Matsuoka, Masami; Ishihara, Noriyuki; and Tamura, Masahiro, 4,929,479, Cl. 428-35.200.
Ishihara Sangyo Kaisha Ltd.: *See*—
Haga, Takahiro; Tsujii, Yasuhiro; Isogai, Tatsuo; Murai, Shigeo; and Tanaka, Toshihiro, 4,929,729, Cl. 544-330.000.
Ishihara, Takeyuki: *See*—
Ainoya, Masayuki; Ishihara, Takeyuki; Kanno, Tesuo; Kikuchi, Takahiro; Mori, Seiichi; Nobumori, Shogo; and Shirakawa, Junji, 4,929,982, Cl. 355-311.000.
Ishii, Kazuo: *See*—
Kato, Eiichi; Ishii, Kazuo; Itakura, Ryosuke; and Sera, Hidefumi, 4,929,526, Cl. 430-87.000.
Kato, Eiichi; Ohno, Shigeru; Ishii, Kazuo; and Itakura, Ryosuke, 4,929,527, Cl. 430-92.000.
Ishii, Susumu; and Matsushima, Hideyuki, to Yoshida Kogyo K.K. Pull tab for slide fastener sliders. 4,928,358, Cl. 24-431.000.
Ishikawa, Fumiyasu: *See*—
Wakayama, Sachio; Ishikawa, Fumiyasu; and Oishi, Kunio, 4,929,548, Cl. 435-71.200.
Ishikawa, Osamu; and Watanabe, Kazuyoshi, to Tochigifujisangyo Kabushiki Kaisha. Power transmission apparatus. 4,928,803, Cl. 192-58.00B.
Ishikawa, Sachiko: *See*—
Arimoto, Akira; Ishikawa, Sachiko; and Kataoka, Keiji, 4,929,044, Cl. 350-96.130.
Ishikawa, Tadashi; Tagami, Shigeru; Akimoto, Kazuo; Tsuyuki, Hiroto; Kawai, Michio; Ito, Kanji; Sato, Takayuki; Otora, Takahito; and Hayakawa, Teruyo, to Seikosha Co., Ltd. Flash photography changeover device. 4,929,977, Cl. 354-420.000.
Ishikawa, Takatoshi, to Alps Electric Co., Ltd. Printing head assembly. 4,929,968, Cl. 346-140.00R.
Ishikawajima-Harima Heavy Industries Co.: *See*—
Tsuchida, Yoshiki, 4,929,089, Cl. 374-44.000.
Ishikura, Keizaburo: *See*—
Saigo, Akira; Maezawa, Shigenari; Kageyama, Tomoaki; Ishikura, Keizaburo; Sera, Akio; and Suehiro, Junji, 4,929,903, Cl. 324-544.000.
Ishitobi, Ken: *See*—
Miyazaki, Kunihiro; Ishitobi, Ken; and Yamaguchi, Yosinobu, 4,929,257, Cl. 51-309.000.
Ishiyama, Masamitsu: *See*—
Kyogoku, Tetsuo; Ishiyama, Masamitsu; and Mino, Masayuki, 4,929,980, Cl. 355-75.000.
Isobe, Noriyuki: *See*—
Nishihara, Yoshio; Isobe, Noriyuki; and Kotera, Satoshi, 4,929,507, Cl. 428-447.000.
Isogai, Tatsuo: *See*—
Haga, Takahiro; Tsujii, Yasuhiro; Isogai, Tatsuo; Murai, Shigeo; and Tanaka, Toshihiro, 4,929,729, Cl. 544-330.000.
ISOTEC Partners, Ltd.: *See*—
Hagerty, James J.; and Pulsifer, David N., 4,929,065, Cl. 350-413.000.
Isover Saint-Gobain: *See*—
Audren, Yves; and Tuffal, Guy, 4,928,898, Cl. 242-55.100.
Isozumi, Shuzoo, to Mitsubishi Denki Kabushiki Kaisha. Electric starter with biased fulcrum. 4,929,857, Cl. 310-83.000.
Istituto Guido Donegani: *See*—
Massardo, Pietro; Bettarini, Franco; Piccardi, Paolo; and Rama, Franco, 4,929,772, Cl. 568-812.000.
Itahana, Tsutomu; Kanno, Hideo; Ono, Tetsuo; Furuta, Futoru; Kobayashi, Susumu; Akimoto, Ryosaku; and Tanigaki, Ryuhei, to Mitsubishi Jukogyo Kabushiki Kaisha. Capacity control valve for a compressor. 4,928,723, Cl. 137-116.300.
Itakura, Ryosuke: *See*—
Kato, Eiichi; Ishii, Kazuo; Itakura, Ryosuke; and Sera, Hidefumi, 4,929,526, Cl. 430-87.000.
Kato, Eiichi; Ohno, Shigeru; Ishii, Kazuo; and Itakura, Ryosuke, 4,929,527, Cl. 430-92.000.
Ito, Kanji: *See*—
Ishikawa, Tadashi; Tagami, Shigeru; Akimoto, Kazuo; Tsuyuki, Hiroto; Kawai, Michio; Ito, Kanji; Sato, Takayuki; Otora, Takahito; and Hayakawa, Teruyo, 4,929,977, Cl. 354-420.000.
Ito, Koji: *See*—
Fujie, Naofumi; Imaizumi, Tomoaki; Ito, Koji; and Okada, Shoji, 4,929,072, Cl. 350-582.000.
Ito, Kuniyasu, to Toyoda Gosei Co., Ltd. Air-conditioning control box. 4,930,048, Cl. 362-26.000.
Ito, Michiyasu: *See*—
Narimatsu, Osamu; Ito, Michiyasu; Komatsu, Kazuyoshi; and Shibata, Yasuhiro, 4,928,438, Cl. 51-283.00R.
Ito, Tsuneo: *See*—
Sakai, Takeshi; and Ito, Tsuneo, 4,928,550, Cl. 74-595.000.
Itoh, Hiroshi: *See*—
Takada, Mitsuru; Takahashi, Tokuyuki; and Itoh, Hiroshi, 4,928,557, Cl. 74-867.000.
Itoh, Kiyoo: *See*—
Tanaka, Hitoshi; Hori, Ryoichi; Itoh, Kiyoo; Kimura, Katsutaka; and Shimohigashi, Katsuhiro, 4,930,112, Cl. 365-226.000.
Itonaga, Makoto: *See*—
Nakamura, Nobuaki; Hirose, Yukimi; Kai, Masakatsu; and Itonaga, Makoto, 4,929,822, Cl. 250-201.400.
Itou, Kazumi; Ebe, Kazuyoshi; and Minagawa, Toshio, to FSK Kabushiki Kaisha. Cover tape for sealing chip-holding parts of carrier tape. 4,929,486, Cl. 428-77.000.
ITT Corporation: *See*—
Elderton, Peter P.; Granada, Richard P.; and Howes, Royal E., 4,930,041, Cl. 361-190.000.
Finney, Robert E., 4,929,197, Cl. 439-660.000.
Williams, Jack L., 4,930,057, Cl. 362-272.000.

Iuchi, Shigeru: *See*—
Fujigaki, Takashi; Fujinaga, Yoshikazu; Tokuda, Shuichiro; Furukawa, Noriyuki; Ichimura, Kiyoshi; Shibuya, Yukio; and Iuchi, Shigeru, 4,929,169, Cl. 425-385.000.

Ivannikov, Alfred V.; and Abudardin, Vladimir Z., to Tsentr Nauchno-Tekhnicheskogo Tvorchestva Molodezhi "ASTRON" . Method for electrical arc spot welding with consumable electrode. 4,929,812, Cl. 219-137.200.

Iwagaki, Yutaka: *See*—
Kobayashi, Kenzo; Iwagaki, Yutaka; Hasegawa, Mitsuyo; and Suganuma, Kazushi, 4,930,119, Cl. 370-16.100.

Iwagawa, Yoshihiro; Yahagi, Toshio; and Fujii, Etsuo, to Honda Giken Kogyo Kabushiki Kaisha. Hydraulic brake pressure control device for a vehicle. 4,929,036, Cl. 303-115.000.

Iwamura, Kazumitsu: *See*—
Oku, Masahiro; and Iwamura, Kazumitsu, 4,928,742, Cl. 152-534.000.

Iwasa, Tadanobu, to Toyoda Gosei Co., Ltd. Weather strip for automobile. 4,929,481, Cl. 428-36.100.

Iwasa, Tadanobu, to Toyoda Gosei Co., Ltd. Window frame rubber moldings for automobile. 4,929,490, Cl. 428-195.000.

Iwasaki, Hideo: *See*—
Sakamoto, Kiichiro; and Iwasaki, Hideo, 4,929,974, Cl. 354-299.000.

Iwata, Michiyoshi: *See*—
Matsumoto, Kazuyuki; Hashimoto, Masataka; and Iwata, Michiyoshi, 4,928,556, Cl. 475-149.000.

Iwata, Tadao: *See*—
Tominaga, Kaoru; and Iwata, Tadao, 4,929,708, Cl. 528-118.000.

Iwata, Toshio: *See*—
Ohkubo, Satoru; and Iwata, Toshio, 4,928,653, Cl. 123-435.000.

Izawa, Koji: *See*—
Harakawa, Yoshihiro; Takahashi, Seiya; Izawa, Koji; Takeuchi, Hidemitsu; and Ikari, Keizo, 4,929,316, Cl. 204-56.100.

Izawa, Shoji, to Tokyo Electric Co., Ltd. Communication terminal device. 4,930,017, Cl. 358-296.000.

Izuhara, Seiji: *See*—
Morita, Yasuhiko; Kakiguchi, Yoshitomi; and Izuhara, Seiji, 4,929,378, Cl. 252-105.000.

Izutsu, Hitoshi: *See*—
Inoue, Toshio; Mine, Takayuki; Izutsu, Hitoshi; Yamaguchi, Toshihide; Kobata, Fumihiro; and Kawabata, Juheiji, 4,929,665, Cl. 524-500.000.

J. G. Anschuetz GmbH: *See*—
Bordt, Wolfgang; and Gerstenberger, Friedrich, 4,928,661, Cl. 124-69.000.

J. I. Case Company: *See*—
Thedford, Guy N.; and Wells, Gary L., 4,928,459, Cl. 56-13.300.

Jabs, Gert: *See*—
Sch], Thomas; Jabs, Gert; and Richartz, Adolf, 4,929,710, Cl. 528-205.000.

Jache, Otto. Method for producing lead accumulator with thixotropic gel. 4,929,251, Cl. 29-623.500.

Jackson, Noel E. Collapsible downrigger arm assembly. 4,928,420, Cl. 43-27.400.

Jacobs, Thomas G. M.; and De Vroome, Clemens J. M., to Stork Contiweb B.V. Heating appliance with combustion air preheat. 4,929,173, Cl. 431-215.000.

Jacobson, Earl B. Negative air control unit and closure structure. 4,928,581, Cl. 98-1.500.

Jacobson, Earl B. HEPA filter module. 4,929,261, Cl. 55-213.000.

Jaeger, Eduard A.: *See*—
Levine, Anthony H.; and Jaeger, Eduard A., 4,928,954, Cl. 272-8.00N.

Jaeggi, Knut A., to Ciba-Geigy Corporation. Azacycloalkylalkanediphosphonic acids useful for treating diseases attributed to calcium metabolism disorders. 4,929,606, Cl. 514-80.000.

Jagadish, Hosagrahar V.: *See*—
Agrawal, Rakesh; and Jagadish, Hosagrahar V., 4,930,072, Cl. 364-300.000.

Jager, Andreas, to Jager, Arnold. Apparatus for aerating water. 4,929,397, Cl. 261-65.000.

Jager, Arnold: *See*—
Jager, Andreas, 4,929,397, Cl. 261-65.000.

Jain, Sangya: *See*—
Spak, Mark A.; Mammato, Donald; Durham, Dana; and Jain, Sangya, 4,929,536, Cl. 430-325.000.

Jakobsen, Katherine, to Satter, Inc. Air permeable camera case. 4,928,819, Cl. 206-316.200.

Jakobsen, Kjell M.; and Nilsson, Claes T., to PLM AB. Apparatus for producing a tubular object of polyethelene terephthalate or other thermoplastic material from a tubular blank of amorphous material. 4,929,168, Cl. 425-384.000.

James River Corporation: *See*—
Rittenhouse, David A.; Neurohr, Fred; and Estridge, Doug R., 4,929,470, Cl. 427-55.000.

James River Corporation of Virginia: *See*—
Suskind, Stuart P.; and Miller, Joseph H., 4,929,498, Cl. 428-288.000.

James, Robert B., Jr.; and Kaines, Tom N., to UOP. Process for the simultaneous hydroconversion of a first feedstock comprising unsaturated, halogenated organic compounds and a second feedstock comprising saturated, halogenated organic compounds. 4,929,781, Cl. 585-310.000.

Jamieson Film Company: *See*—
Cunningham, John A.; Prestjohn, Mark O.; Reed, Bobby P.; and Smith, Martin D., 4,929,976, Cl. 354-322.000.

Janssen, Petrus C. H.: *See*—
van den Nieuwelaar, Adrianus J.; and Janssen, Petrus C. H., 4,928,351, Cl. 17-11.000.

Janssens, Luc. Trough for soil irrigation and moistening. 4,928,426, Cl. 47-48.500.

Jao, Tze-Chi: *See*—
Powers, William J., III; Matthews, Leonard A.; and Jao, Tze-Chi, 4,929,373, Cl. 252-33.000.

Japan Aviation Electronics Industry Limited: *See*—
Ohno, Aritaka; Shitara, Kanji; and Harashima, Masakazu, 4,928,894, Cl. 242-7.090.

Jardine, Stuart, to Schlumberger Technology Corporation. Method of determining drill bit wear. 4,928,521, Cl. 73-151.000.

Jarkko, Turpeinen: *See*—
Paakkonen, Taisto; Veijo, Vainino; and Jarkko, Turpeinen, 4,929,019, Cl. 296-223.000.

Jarovitzky, Peter A.; Fu, Yun-Lung; and Dexter, Robin W., to American Cyanamid Company. Polymers and process of making same. 4,929,687, Cl. 525-328.200.

Jaworski, George: *See*—
Chun, Victor L.; Hunter, James R.; and Jaworski, George, 4,929,276, Cl. 83-552.000.

Jeffery, James E.; and Whybrow, Derek, to Boots Company, PLC. Therapeutic compound. 4,929,629, Cl. 514-646.000.

Jelich, Klaus; Brandes, Wilhelm; Hanssler, Gerd; and Reinecke, Paul, to Bayer Aktiengesellschaft. Thienyl and furyl containing derivatives. 4,929,738, Cl. 549-76.000.

Jelsma, Henk H., to Baroid Technology, Inc. Method and apparatus for setting and retrieving a deflection tool. 4,928,767, Cl. 166-377.000.

Jenkner, Erwin. Process for conveying a transport platform to a lifting table of a stacking station. 4,929,147, Cl. 414-786.000.

Jennings, Glenn A., to University of California, The Regents of the. Dynamic activity-creating data-driven computer architecture. 4,930,102, Cl. 364-900.000.

Jennings, Norman T. Water supply apparatus. 4,928,633, Cl. 119-75.000.

Jensen, Jary D., to Dow Corning Corporation. Organosiloxane compositions yielding elastomers with improved recovery following prolonged compression. 4,929,669, Cl. 524-861.000.

Jensen, Mark B. System for positioning fasteners. 4,928,867, Cl. 227-7.000.

Jerman, Franz: *See*—
Torbus, Marek; Jerman, Franz; Ladegourdie, Gerard; Lingemann, Dirk; Seiss, Willi; and Vujevic, Aleksandar, 4,929,649, Cl. 523-145.000.

Jer's Pattern Project, Inc.: *See*—
Kragt, Gerald A., 4,928,399, Cl. 33-562.000.

Jervis B. Webb Company: *See*—
Duczkowski, Edward, Jr.; and McDonald, Clayton C., 4,928,602, Cl. 104-111.000.

Jespersen, Frank, to Milliken Denmark A/S. Procedure and label for bar code marking on vulcanizable or vulcanized rubber products. 4,929,820, Cl. 235-487.000.

Jidosha Denki Kogyo Kabushiki Kaisha: *See*—
Kato, Masaru, 4,929,876, Cl. 318-444.000.

Jidosha Kiki Co., Ltd.: *See*—
Masaka, Mitusuke; Hatanaka, Koji; Maruta, Kenji; and Okazaki, Seiji, 4,929,813, Cl. 219-270.000.

Jin, Iljoon; and Lloyd, David J., to Alcan International Limited. Aluminum alloys and a method of production. 4,929,421, Cl. 420-545.000.

Jobes, David R.: *See*—
Nicolson, Susan C.; and Jobes, David R., 4,928,691, Cl. 128-633.000.

Johann, Maischberger: *See*—
Schupp, Gerhard; Tscheschlok, Klaus; and Johann, Maischberger, 4,928,386, Cl. 29-824.000.

Johannesen, Donald D.; and Taig, Alistair G., to Allied-Signal Inc. Electrically operated drum brake. 4,928,543, Cl. 475-196.000.

John Fluke Mfg. Co., Inc.: *See*—
Rysavy, Peter B.; and Fuller, Maurice J., 4,929,935, Cl. 340-712.000.

John Wyeth and Brothers Limited: *See*—
Cliffe, Ian A., 4,929,625, Cl. 514-304.000.

Johns Hopkins University, The: *See*—
Halperin, Henry; Tsitlik, Joshua; Weisfeldt, Myron; and Gelfand, Mark, 4,928,674, Cl. 128-30.200.

Johnson, David R.: *See*—
Moll, Norman G.; and Johnson, David R., 4,929,645, Cl. 521-98.000.

Johnson, Donald A.: *See*—
Hoots, John E.; Johnson, Donald A.; Fong, Dodd W.; and Kneller, James F., 4,929,425, Cl. 422-13.000.

Johnson, Jerry E.; and Hoerner, Clinton C., Jr., to TRW Inc. Crossarm valve seat with pulling ledge. 4,928,726, Cl. 137-327.000.

Johnson, Ralph: *See*—
Hanson, Violet; and Johnson, Ralph, 4,929,224, Cl. 493-194.000.

Johnson, Stephen P.: *See*—
Woodworth, Jonathan J.; Johnson, Stephen P.; Miller, David R.; Kester, Jeffrey J.; and Kershaw, Stanley S., Jr., 4,930,039, Cl. 361-127.000.

Johnson, Thomas H.: *See*—
Slaugh, Lynn H.; Johnson, Thomas H.; and Hoxmeier, Ronald J., 4,929,584, Cl. 502-112.000.

Johnson, Wayne A. Foldable cup holder. 4,928,873, Cl. 229-1.50H.

Johnston, Gerald, to Lenco Machines & Tool Co. Apparatus and method for separating recyclable materials. 4,929,342, Cl. 209-12.000.
Johnston, Michael D.; and Berger, Henry, to Burroughs Wellcome Co. Low pH pharmaceutical formulation containing t-PA. 4,929,444, Cl. 424-94.640.
Johnston Pump/General Valve, Inc.: *See*—
Vahala, Kerry J.; and Hoenk, Michael E., 4,929,041, Cl. 350-96.100.
Jois, Yajnanarayana H. R.: *See*—
Gibson, Harry W.; and Jois, Yajnanarayana H. R., 4,929,713, Cl. 528-230.000.
Jones, Arthur L.; and McGaha, George, to Pelton & Crane Company, The. Quick-release dental light handle. 4,930,058, Cl. 362-400.000.
Jones, Elene K. Leg immobilizer-drag for training swimmers. 4,929,205, Cl. 441-60.000.
Jones, Peter W. J. Anti-reflection technique. 4,929,055, Cl. 350-276.00R.
Jones, Thomas R., to ECC International Limited. Process for treating clay minerals. 4,929,580, Cl. 501-148.000.
Jorgensen, Janine L.: *See*—
Caskey, Terrence L.; Trimmer, Johnny L.; and Jorgensen, Janine L., 4,929,259, Cl. 55-158.000.
Joshi, Narendra D.; and Moreno, Frederick E., to PruTech II. Staged low NOx premix gas turbine combustor. 4,928,481, Cl. 60-737.000.
Jouveinal S.A.: *See*—
Calvet, Alain P.; Junien, Jean-Louis; Pascal, Ives R.; Pascaud, Xavier B.; and Roman, Francois J., 4,929,614, Cl. 514-214.000.
Joyama, Norio; and Aoki, Ikumi, to Meiji Seika Kaisha, Ltd. Nutcracker. 4,928,590, Cl. 99-576.000.
Juki Corporation: *See*—
Akutsu, Hiromi, 4,928,610, Cl. 112-153.000.
Junien, Jean-Louis: *See*—
Calvet, Alain P.; Junien, Jean-Louis; Pascal, Ives R.; Pascaud, Xavier B.; and Roman, Francois J., 4,929,614, Cl. 514-214.000.
Junk, Ronald K.: *See*—
Urmson, William T., Jr.; Gaslevic, Emeric; and Junk, Ronald K., 4,928,600, Cl. 104-17.100.
Junkuan, Wang: *See*—
Clausen, Martin; Rys, Paul; and Junkuan, Wang, 4,929,771, Cl. 568-798.000.
Jupiter Dentsu Co., Ltd.: *See*—
Seidoh, Masami, 4,929,195, Cl. 439-610.000.
Kabushiki Kaisha Daikin Seisakusho: *See*—
Takeuchi, Hiroshi; and Yoshimura, Yoshinari, 4,928,805, Cl. 192-106.200.
Kabushiki Kaisha Hokkaido Nissin: *See*—
Emura, Tatao; and Ohba, Kiyoshi, 4,929,453, Cl. 426-63.000.
Emura, Tatao; and Ohba, Kiyoshi, 4,929,558, Cl. 435-252.500.
Kabushiki Kaisha Kobe Seiko Sho: *See*—
Kitagawa, Kazuo; Komatsu, Fumiaki; Masaki, Takayoshi; Sawada, Yoshihisa; and Inada, Eiichi, 4,929,394, Cl. 252-633.000.
Kabushiki Kaisha Mori Seiki Seisikusho: *See*—
Yaguchi, Yoshinori; Kubota, Masahiro; and Nakaminami, Masamitsu, 4,928,381, Cl. 29-568.000.
Kabushiki Kaisha Neriki: *See*—
Daicho, Norio; Kawahara, Masakatsu; Nitta, Jiro; Miyazaki, Koji; and Yonezawa, Keitaro, 4,928,919, Cl. 251-89.000.
Kabushiki Kaisha Okazaki Seisakusho: *See*—
Taguchi, Seizo; Oketani, Toshiharu; Ohashi, Michihiro; Tanaka, Hideaki; and Terao, Hiroshi, 4,929,092, Cl. 374-183.000.
Kabushiki Kaisha Sanwa Kagaku Kenkyusho: *See*—
Sawai, Eiichi; Kurono, Masayasu; Asai, Hiromiotu; Mitani, Takahiko; Ninomiya, Naohisa; Sugiyama, Takao; Furukawa, Eiji; and Michishita, Hisashi, 4,929,438, Cl. 424-10.000.
Kabushiki Kaisha Tokai Rika Denki Seisakusho: *See*—
Furuhashi, Kenshi; and Sawada, Hiroyuki, 4,929,806, Cl. 200-61.540.
Yamada, Kazuhiko, 4,928,779, Cl. 180-178.000.
Kabushiki Kaisha Toshiba: *See*—
Egawa, Jiro; Tanimoto, Koji; and Miura, Kunihiko, 4,930,087, Cl. 364-518.000.
Fukasawa, Yoshihito, 4,930,086, Cl. 364-468.000.
Imamura, Kaoru, 4,928,838, Cl. 219-121.690.
Inoue, Toshinobu, 4,929,160, Cl. 418-55.000.
Kajihara, Shigehiro, 4,929,085, Cl. 364-518.000.
Kanda, Shuhei; Hirota, Mitugu; and Narushima, Teruo, 4,930,024, Cl. 360-10.100.
Kushiyama, Natsuki, 4,929,945, Cl. 341-50.000.
Matsumoto, Osamu; Maruyama, Tadashi; Murata, Hiroyoshi; Abe, Isao; Shigematsu, Tomohisa; Shinada, Kazuyoshi; Suzuki, Yasoji; and Kobayashi, Ichiro, 4,930,105, Cl. 365-185.000.
Morita, Isao, 4,930,029, Cl. 360-97.010.
Ohkawa, Hideki; and Ozawa, Norio, 4,929,485, Cl. 428-64.000.
Shiobara, Yashuhisa, 4,930,121, Cl. 370-85.400.
Tanaka, Shigeru; and Miura, Kazutoshi, 4,930,064, Cl. 363-161.000.
Tominaga, Mamoru; Kokado, Naoyuki; Gonpei, Katsuhiro; Nira, Hisami; and Taya, Akira, 4,929,061, Cl. 350-338.000.
Tsunoda, Yoshiaki; and Kanaya, Masatoshi, 4,929,563, Cl. 437-6.000.
Yonezawa, Akihiro; Sasaki, Hiroki; Mitsuyuki, Yoichiro; Mori, Yasuki; and Ishigami, Toshihiko, 4,929,869, Cl. 313-639.000.
Yoshikawa, Kuniyoshi, 4,929,988, Cl. 357-23.500.
Kaczmarek, James S.; and Kareta, Kenneth C., to Permaflex Company. Non-synchronous assembly system. 4,928,383, Cl. 29-711.000.
Kaeding, Warren W.; and Valyocsik, Ernest W., to Mobil Oil Corporation. Catalytic conversion of propane to ethylene over ZSM-23. 4,929,790, Cl. 585-651.000.
Kaeding, Warren W., to Mobil Oil Corporation. Catalytic conversion of propane to ethylene over ZSM-50. 4,929,791, Cl. 585-651.000.
Kagami, Isao: *See*—
Hirayama, Takanobu; Funahashi, Hiroyuki; Yokota, Eiji; Uehara, Mitsuyoshi; Kagami, Isao; Hasegawa, Makoto; and Mizuno, Masaru, 4,929,105, Cl. 400-625.000.
Kageyama, Shuhei; Suzuki, Takahiko; and Yamagishi, Yuichi, to Kotobuki & Co., Ltd. Swing-type mechanical pencil. 4,929,107, Cl. 401-65.000.
Kageyama, Tomoaki: *See*—
Saigo, Akira; Maezawa, Shigenari; Kageyama, Tomoaki; Ishikura, Keizaburo; Sera, Akio; and Suehiro, Junji, 4,929,903, Cl. 324-544.000.
Kai, Masakatsu: *See*—
Nakamura, Nobuaki; Hirose, Yukimi; Kai, Masakatsu; and Itonaga, Makoto, 4,929,822, Cl. 250-201.400.
Kai, Yasunobu: *See*—
Machida, Yoshimasa; Negi, Shigeto; Kamiya, Takashi; Komatu, Yuuki; Sugiyama, Isao; Kai, Yasunobu; Nakamura, Takaharu; Naito, Toshihiko; Kitoh, Kyosuke; Katsu, Kanemasa; and Yamauchi, Hiroshi, 4,929,612, Cl. 514-202.000.
Kai, Yukio: *See*—
Watanabe, Tadahiko; Shobu, Kazuhisa; Kai, Yukio; Yamamoto, Hideki; Sudoh, Eiichi; Yagishita, Osamu; and Hayakawa, Junshiro, 4,929,417, Cl. 419-12.000.
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Awano, Hikaru; Asai, Seiichi; Kaneko, Katsuo; Kaida, Hiroshi; and Yoshida, Fujio, 4,928,882, Cl. 239-112.000.
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Ichino, Kouji, 4,928,534, Cl. 73-861.180.
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Kajita, Toshio: *See*—
Suzuki, Akinori; Hyeon, Suong B.; Kajita, Toshio; Furushima, Masakazu; Yoshinaka, Shigeo; Suzuki, Takashi; Oda, Mitsunori; and Tanaka, Akinori, 4,929,267, Cl. 71-77.000.
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Morita, Yasuhiko; Kakiguchi, Yoshitomi; and Izuhara, Seiji, 4,929,378, Cl. 252-105.000.
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Antranikian, Garabed; and Gottschalk, Gerhard, 4,929,557, Cl. 435-202.000.
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Walsh, Warren J.; and Kallevig, Bruce, 4,928,722, Cl. 137-881.000.
Kalnes, Tom N.: *See*—
James, Robert B., Jr.; and Kalnes, Tom N., 4,929,781, Cl. 585-310.000.
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Takanashi, Kazumasa; Kameda, Takashi; and Shibatani, Haruo, 4,929,404, Cl. 264-29.500.
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Matayoshi, Yutaka; Yoshimura, Toru; Kamegaya, Shigeru; and Hamai, Kyugo, 4,928,650, Cl. 123-90.240.
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Takahashi, Toshiro; Kameoka, Kimitaka; and Inagaki, Yoshio, 4,929,535, Cl. 430-264.000.
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Hatori, Masami; Nozaki, Nobuharu; and Kamiyama, Kozi, 4,929,042, Cl. 350-96.130.
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Tsunoda, Yoshiaki; and Kanaya, Masatoshi, 4,929,563, Cl. 437-6.000.

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Miyoshi, Takahito; Kanazawa, Minoru; Sugisaki, Tsutomu; Yamada, Takuzi; and Okuzawa, Yasutoshi, 4,930,032, Cl. 360-132.000.

Kanda, Shuhei; Hirota, Mitugu; and Narushima, Teruo, to Kabushiki Kaisha Toshiba. Variable speed magnetic medium recording and playback apparatus. 4,930,024, Cl. 360-10.100.

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Fuse, Toshikazu; Yamamoto, Atsushi; and Sano, Junji, 4,929,248, Cl. 8-128.100.

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Hagiwara, Zenji; Ando, Satoshi; and Nohara, Saburo, 4,929,431, Cl. 423-328.000.

Kaneko, Katsuo: *See*—
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Shinya, Yoshiyuki; Tabara, Yoshitaka; Okuno, Itaru; Kaneko, Tadashi; and Watanabe, Tomomi, 4,928,652, Cl. 123-417.000.

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Otomura, Keiichiro; Yamashita, Takayuki; Kanemitsu, Setsuo; Nakabayashi, Shigetoshi; and Miki, Hideo, 4,929,430, Cl. 423-11.000.

Kanemura, Yoshinobu: *See*—
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Kanno, Tesuo: *See*—
Ainoya, Masayuki; Ishihara, Takeyuki; Kanno, Tesuo; Kikuchi, Takahiro; Mori, Seiichi; Nobumori, Shogo; and Shirakawa, Junji, 4,929,982, Cl. 355-311.000.

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Kareta, Kenneth C.: *See*—
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Harwood, Jon W.; Karlgaard, Wayne A.; and Clegg, Michael W., 4,928,372, Cl. 29-890.080.

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Altman, Lawrence J.; Choi, Byung C.; and Karsner, Grant G., 4,929,335, Cl. 208-106.000.

Karube, Norio; Egawa, Akira; Yamazaki, Etsuo; Iehisa, Nobuaki; and Manabe, Mitsuo, to Fanuc Ltd. Laser oscillator device. 4,930,135, Cl. 372-33.000.

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Arimoto, Akira; Ishikawa, Sachiko; and Kataoka, Keiji, 4,929,044, Cl. 350-96.130.

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Sugihara, Takashi; Uda, Kazutaka; Tabuchi, Hiroki; Inami, Yasuhiko; Hijikigawa, Masaya; and Kataoka, Shoei, 4,928,513, Cl. 73-1.00G.

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Abe, Shinya; Miyamoto, Mitsuaki; Tanaka, Masayuki; Akasaka, Kozo; Hayashi, Kenji; Kawahara, Tetsuya; Katayama, Satoshi; Sakuma, Yoshinori; Suzuki, Takeshi; and Yamatsu, Isao, 4,929,623, Cl. 514-293.000.

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Katchka, Jay R.: *See*—
Kelly, Samuel T.; and Katchka, Jay R., 4,928,721, Cl. 137-66.000.

Kato, Eiichi; Ishii, Kazuo; Itakura, Ryosuke; and Sera, Hidefumi, to Fuji Photo Film Co., Ltd. Electrophotographic lithographic printing plate precursor. 4,929,526, Cl. 430-87.000.

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Kato, Hironori: *See*—
Bannai, Hiroyuki; Ida, Yuichi; and Kato, Hironori, 4,928,901, Cl. 242-85.000.

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Kato, Makoto; Saimi, Tetsuo; and Ohara, Shunji, to Matsushita Electric Industrial Co., Ltd. Optical pickup head with holographic servo signal detection using a spot size detection system. 4,929,823, Cl. 250-201.500.

Kato, Masaru, to Jidosha Denki Kogyo Kabushiki Kaisha. Electric windshield wiping apparatus. 4,929,876, Cl. 318-444.000.

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Kato, Toshifumi, to Pioneer Electronic Corporation. Mobile speaker system. 4,928,787, Cl. 181-141.000.

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Shibazaki, Osamu; Miyazawa, Yorikatu; and Kato, Toshio, 4,928,826, Cl. 206-409.000.

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Machida, Yoshimasa; Negi, Shigeto; Kamiya, Takashi; Komatu, Yuuki; Sugiyama, Isao; Kai, Yasunobu; Nakamura, Takaharu; Naito, Toshihiko; Kitoh, Kyosuke; Katsu, Kanemasa; and Yamauchi, Hiroshi, 4,929,612, Cl. 514-202.000.

Katz, Ronald A., to First Data Resources Inc. Telephonic interface control system. 4,930,150, Cl. 379-93.000.

Kaufmann, John W.; Swidwa, Kenneth J.; and Hornak, Leonard P., to Westinghouse Electric Corp. Television alignment of mast assembly in refueling of nuclear reactor. 4,929,413, Cl. 376-268.000.

Kaufmann, Meinolph: *See*—
Bohnert, Klaus; Kaufmann, Meinolph; and Nehring, Jurgen, 4,929,830, Cl. 250-227.140.

Kawabata, Juheiji: *See*—
Inoue, Toshio; Mine, Takayuki; Izutsu, Hitoshi; Yamaguchi, Toshihide; Kobata, Fumihiro; and Kawabata, Juheiji, 4,929,665, Cl. 524-500.000.

Kawabe, Masaki: *See*—
Watanabe, Tsutomu; Sagiyama, Masari; Kawabe, Masaki; Tsujihara, Toshiyuki; and Takushima, Shigehiro, 4,929,323, Cl. 204-206.000.
Watanabe, Tsutomu; Sagiyama, Masaru; Kawabe, Masaki; Tsujihara, Toshiyuki; and Takushima, Shigehiro, 4,929,324, Cl. 204-206.000.

Kawada, Haruki: *See*—
Sakai, Kunihiro; Miyazaki, Toshihiko; Eguchi, Ken; Kawada, Haruki; Tomida, Yoshinori; Kimura, Toshiaki; Matsuda, Hiroshi; Takimoto, Kiyoshi; and Saito, Kenji, 4,929,524, Cl. 430-56.000.

Kawahara, Masakatsu: *See*—
Daicho, Norio; Kawahara, Masakatsu; Nitta, Jiro; Miyazaki, Koji; and Yonezawa, Keitaro, 4,928,919, Cl. 251-89.000.

Kawahara, Tetsuya: *See*—
Abe, Shinya; Miyamoto, Mitsuaki; Tanaka, Masayuki; Akasaka, Kozo; Hayashi, Kenji; Kawahara, Tetsuya; Katayama, Satoshi; Sakuma, Yoshinori; Suzuki, Takeshi; and Yamatsu, Isao, 4,929,623, Cl. 514-293.000.

Kawai, Kazumi: *See*—
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Kawai, Michio: *See*—
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Kawai, Nobuyuki; and Nakamura, Mitsuhiro, to Toshiba Silicone Co., Ltd. Push button switch. 4,929,804, Cl. 200-5.00A.

Kawai, Syuji: *See*—
Moritani, Tohei; Oda, Hidemasa; Sato, Toshiaki; Negi, Taichi; Matsumura, Keiji; Kawai, Syuji; Tanaka, Nobuo; and Hirofuji, Satoshi, 4,929,482, Cl. 428-36.400.

Kawai, Toshikazu: *See*—
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Kanamori, Katsuhiro; Kanno, Yoshimitsu; Kurosawa, Toshiharu; Kawakami, Hidehiko; Naka, Motohiko; and Kotera, Hiroaki, 4,929,978, Cl. 355-38.000.

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Kawanaka, Chigusa: *See*—
Kanaoka, Masaharu; Kawanaka, Chigusa; Negoro, Takaharu; and Agui, Hideo, 4,929,547, Cl. 435-69.100.

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Takeda, Hisao; and Kawano, Mutsumi, 4,929,655, Cl. 524-458.000.

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Masaki, Takeshi; Kawata, Koichi; and Sakagaito, Yukuo, 4,928,435, Cl. 51-55.000.

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Kitayama, Shinichiro; Adachi, Teruho; Ueda, Masahiro; Aoki, Yuichi; Shiiki, Satoshi; Takigawa, Akio; Yoshida, Motoaki; Imamura, Naoya; Maeda, Koichi; and Kayanoki, Hisayuki, 4,929,523, Cl. 430-4.000.

Kaye, Howard, to Designs For Leisure, Ltd. Ornament displaying furniture. 4,929,021, Cl. 297-193.000.

Kaylor, William R.; and Fisher, Frederick A., to North American Philips Corporation. Peak radiated energy locator. 4,929,960, Cl. 343-703.000.

Kazecki, Henry L.; and Baker, James C., to Motorola, Inc. Time division multiplex system suited for burst analog transmission. 4,930,126, Cl. 370-109.000.

Keating, Bruce E.: *See*—
Yeates, Richard P.; Keating, Bruce E., and Halliar, William R., 4,929,132, Cl. 410-56.000.

Keblys, Kestutis A.; Ao, Meng-Sheng; and Burton, Lester P. J., to Ehtyl Corporation. Transhalogenation of halophosphorus compounds. 4,929,745, Cl. 558-84.000.

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Oberjatzas, Gunter; and Keesen, Heinz-Werner, 4,930,025, Cl. 360-64.000.

Keesey, Charles R.; and Flood, Ted C., to International Baler Corp. Bale-opening method and apparatus. 4,929,141, Cl. 414-412.000.

Kelley, Richard E., Sr.: *See*—
Goodman, Ronald L.; and Kelley, Richard E., Sr., 4,928,443, Cl. 52-58.000.

Kelly, Samuel T.; and Katchka, Jay R. Fuel control valve construction, parts therefor and methods. 4,928,721, Cl. 137-66.000.

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Koster, Marinus P.; Van Der Hoek, Willem; Kemper, Nicolaas R.; and Soemers, Hermanus M. J. R., 4,929,146, Cl. 414-744.500.

Kenaston, Kenneth R.: *See*—
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Kendall Company, The: *See*—
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Massa, Ted R.; and Siddle, David R., 4,928,373, Cl. 29-278.000.

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Keough, James: *See*—
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Kerekjarto, Bela: *See*—
Lang, Hans-Jochen; Hropot, Max; Granzer, Ernold; and Kerekjarto, Bela, 4,929,643, Cl. 514-603.000.

Kerle, Edward J.: *See*—
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Kern, Ronald D.: *See*—
Thomas, James M.; and Kern, Ronald D., 4,929,367, Cl. 252-8.800.

Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung: *See*—
Gat-Liquornik, Martin; and Naoumidis, Aristides, 4,928,870, Cl. 228-107.000.

Kerr, Stuart R., III; and Moore, James E., to General Electric Company. Coated polycarbonate articles. 4,929,506, Cl. 428-412.000.

Kerr, Walter B.: *See*—
Lindsay, Mitchell H.; and Kerr, Walter B., 4,928,491, Cl. 60-734.000.

Kerrigan, James E., to Duo-Fast Corporation. Fastener driving tool. 4,928,868, Cl. 227-131.000.

Kershaw, Stanley S., Jr.: *See*—
Woodworth, Jonathan J.; Johnson, Stephen P.; Miller, David R.; Kester, Jeffrey J.; and Kershaw, Stanley S., Jr., 4,930,039, Cl. 361-127.000.

Kester, Jeffrey J.: *See*—
Woodworth, Jonathan J.; Johnson, Stephen P.; Miller, David R.; Kester, Jeffrey J.; and Kershaw, Stanley S., Jr., 4,930,039, Cl. 361-127.000.

Khoury, Issam A.; and Langer, Horst G., to Dow Chemical Company, The. Melt processable, green, ceramic precursor powder. 4,929,575, Cl. 501-137.000.

Khozai, Bahram. Shoe cover package. 4,928,849, Cl. 221-45.000.

Kibun Co., Ltd.: *See*—
Wakayama, Sachio; Ishikawa, Fumiyasu; and Oishi, Kunio, 4,929,548, Cl. 435-71.200.

Kictec Incorporation: *See*—
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Kida, Kenji, to Kormori Printing Machinery Co., Ltd. Sheet reversing unit for sheet printing press. 4,928,586, Cl. 101-230.000.

Kida, Tohru: *See*—
Sugihara, Kanji; Yamamoto, Motohiro; Kida, Tohru; and Fukazawa, Minoru, 4,929,472, Cl. 427-215.000.

Kidd, Stephen: *See*—
Diebolt, Richard A.; Kidd, Stephen; and Rivers, Donald E., Jr., 4,929,130, Cl. 409-136.000.

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Kientsch-Engel, Rosemarie; Worner, Walter; and Kleinhammer, Gerd, to Boehringer Mannheim GmbH. Process for the determination of an antibody in human body fluids. 4,929,543, Cl. 435-5.000.

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Kihara, Kazuyuki: *See*—
Ando, Tsuyoshi; Hirono, Nakayasu; Nakao, Hirotoshi; Mito, Akio; Kihara, Kazuyuki; Hatakenaka, Kosuke; and Ogawa, Hiroshi, 4,928,730, Cl. 137-554.000.

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Mizutani, Minoru; Kikuchi, Hiroshi; Watanabe, Shoichi; Hayashi, Kuniharu; and Maekawa, Masanori, 4,929,102, Cl. 400-248.000.

Kikuchi, Masamichi: *See*—
Yuchi, Sadataka; Machida, Haruchika; Matsuoka, Naoya; and Kikuchi, Masamichi, 4,930,095, Cl. 364-571.010.

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Kilhefiner, Paul T., III: *See*—
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Park, Hyung M.; and Kim, Dong G., 4,929,567, Cl. 437-41.000.

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Kida, Kenji, 4,928,586, Cl. 101-230.000.

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Kanamori, Katsuhiro; Kanno, Yoshimitsu; Kurosawa, Toshiharu; Kawakami, Hidehiko; Naka, Motohiko; and Kotera, Hiroaki, 4,929,978, Cl. 355-38.000.

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Miles, Thomas O.; and Kreitzer, Carl E., 4,929,955, Cl. 342-371.000.

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ter Hasebrg, Jan L.; Nedwig, Joachim; and Kruse, Klaus-Dieter, 4,929,842, Cl. 250-551.000.

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Kubota, Yoshihiro: *See*—
Saito, Shigeaki; Matsueda, Toshiharu; Kubota, Yoshihiro; and Iguchi, Masaaki, 4,929,572, Cl. 437-164.000.

Kubushiki Kaisha Toshiba: *See*—
Imanishi, Kazuo, 4,929,908, Cl. 330-254.000.

Kudo, Masaki; and Suzuki, Hideo, to Yamaha Corporation. Envelope shape generator for tone signal control. 4,928,569, Cl. 84-626.000.

Kudo, Norio: *See*—
Kunimaru, Noritaka; Shiba, Katsuhiro; Kudo, Norio; Inoshita, Gen; and Sato, Shogo, 4,930,028, Cl. 360-85.000.

Kudoh, Yoshimitsu: *See*—
Murayama, Jin; Kudoh, Yoshimitsu; and Kondo, Ryuji, 4,930,006, Cl. 358-44.000.

Kuenast, Christoph: *See*—
Leyendecker, Joachim; Buerstinghaus, Rainer; Theobald, Hans; Kuenast, Christoph; and Hofmeister, Peter, 4,929,617, Cl. 514-252.000.
Kuga, Masao: *See*—
Yokota, Akira; and Kuga, Masao, 4,929,070, Cl. 350-432.000.
Kuge, Yukihiro: *See*—
Eguchi, Tamotsu; Oshiro, Takashi; Kuge, Yukihiro; Mochida, Kenichi; and Uwajima, Takayuki, 4,929,551, Cl. 435-106.000.
Kuhn, Dieter. Device for reducing rinsing water consumption. 4,928,327, Cl. 4-395.000.
KUKA Schweissanlagen and Roboter GmbH: *See*—
Schupp, Gerhard; Tscheschlok, Klaus; and Johann, Maischberger, 4,928,386, Cl. 29-824.000.
Kukel, Christine F.: *See*—
Herman, Rod A.; and Kukel, Christine F., 4,929,634, Cl. 514-426.000.
Kulli, John C. Medical needle puncture guard. 4,929,241, Cl. 604-263.000.
Kuma, Kiyoji, to Mitsubishi Kasei Corporation. Process for preparing oximes. 4,929,756, Cl. 564-267.000.
Kumada, Susumu; Mori, Mikio; Nagatani, Ryoji; and Ano, Tadami, to Mitsubishi Denki Kabushiki Kaisha. Equipment for storing blood. 4,928,502, Cl. 62-440.000.
Kumashiro, Koichi: *See*—
Shinoki, Masayoshi; Takagi, Masahiro; Nagatsuka, Ikutaroh; Kumashiro, Koichi; Aoki, Takayoshi; and Takeda, Masayuki, 4,929,528, Cl. 430-108.000.
Kummer, Rudolf: *See*—
Taglieber, Volker; Hoelderich, Wolfgang; Kummer, Rudolf; Mross, Wolf D.; and Saladin, Guenter, 4,929,758, Cl. 564-485.000.
Taglieber, Volker; Hoelderich, Wolfgang; Kummer, Rudolf; Mross, Wolf D.; and Saladin, Guenter, 4,929,759, Cl. 564-485.000.
Kuna, Wayne A.: *See*—
Morris, Lamont C.; Kuna, Wayne A.; and Terzian, Rouben T., 4,929,216, Cl. 446-324.000.
Kunimaru, Noritaka; Shiba, Katsuhiro; Kudo, Norio; Inoshita, Gen; and Sato, Shogo, to Pioneer Electronic Corporation. Tape recorder. 4,930,028, Cl. 360-85.000.
Kunka, Blair S.: *See*—
Vandenbergh, Peter A.; Pucci, Michael J.; Kunka, Blair S.; and Vedamuthu, Ebenezer R., 4,929,445, Cl. 424-115.000.
Kunz, Horst; and Dombo, Berthold, to Orpengen Medizinisch-Molekularbiologische Forschungsgesellschaft mbH. Allylic side chain-containing solid phase systems, processes for the preparation thereof and the use thereof in solid phase reactions. 4,929,671, Cl. 525-54.110.
Kupersmit, Julius B. Container for shipping laboratory animals. 4,928,630, Cl. 119-17.000.
Kuraray Co., Ltd.: *See*—
Moritani, Tohei; Oda, Hidemasa; Sato, Toshiaki; Negi, Taichi; Matsumura, Keiji; Kawai, Syuji; Tanaka, Nobuo; and Hirofuji, Satoshi, 4,929,482, Cl. 428-36.400.
Kurauchi, Makoto; Hashimoto, Michio; Hayasaki, Kiyoshi; Minami, Toshikazu; Ohnishi, Mutsuhiko; and Suzuki, Yohei, to Mitsui Sekiyu Kagaku Kogyo Kabushiki Kaisha; and Shinko Kosen Kogyo Kabushiki Kaisha. Coating material for tendon for prestressed concrete. 4,929,650, Cl. 523-455.000.
Kurihara, Akio: *See*—
Hyogo, Yukihiro; and Kurihara, Akio, 4,929,182, Cl. 439-34.000.
Kuroda, Akio: *See*—
Setoi, Hiroyuki; Kuroda, Akio; Tanaka, Hirokazu; Hirai, Hideo; Marusawa, Hiroshi; and Hashimoto, Masashi, 4,929,639, Cl. 514-452.000.
Kuroda, Masami; Hattori, Yoshimasa; and Furusho, Noboru, to Fuji Electric Co., Ltd. Photoconductor for electrophotography containing azo or disazo. 4,929,525, Cl. 430-75.000.
Kurokawa, Shunji, to Ricoh Company, Ltd. Multiple redialing system. 4,930,155, Cl. 379-354.000.
Kuroki, Yoshiaki: *See*—
Koda, Akihide; Kita, Jun'ichiro; Kuroki, Yoshiaki; Fujiwara, Hiroshi; Takamura, Shinji; and Yamano, Kayoko, 4,929,618, Cl. 514-253.000.
Kurono, Masayasu: *See*—
Sawai, Kiichi; Kurono, Masayasu; Asai, Hiromiotu; Mitani, Takahiko; Ninomiya, Naohisa; Sugiyama, Takao; Furukawa, Eiji; and Michishita, Hisashi, 4,929,438, Cl. 424-10.000.
Kurosaki, Makoto, to Yamaha Corporation. Clutch unit for high-hat cymbals. 4,928,567, Cl. 84-422.300.
Kurosawa, Toshiharu: *See*—
Kanamori, Katsuhiro; Kanno, Yoshimitsu; Kurosawa, Toshiharu; Kawakami, Hidehiko; Naka, Motohiko; and Kotera, Hiroaki, 4,929,978, Cl. 355-38.000.
Kurt Manufacturing Company, Inc.: *See*—
Bernstein, Leon M., 4,928,937, Cl. 269-136.000.
Kurys, Barbara E.: *See*—
Glamkowski, Edward J.; and Kurys, Barbara E., 4,929,615, Cl. 514-219.000.
Kushita, Kenji: *See*—
Hosono, Katsuaki; and Kushita, Kenji, 4,929,220, Cl. 474-152.000.
Kushiyama, Natsuki, to Kabushiki Kaisha Toshiba. Semiconductor memory device having a small number of signal lines. 4,929,945, Cl. 341-50.000.
Kusserow, Bernd; Gagneur, Klaus; and Hofler, Siegfried, to Siemens Aktiengesellschaft. Protective circuit for a power pack for excitation or de-excitation of a superconduction coil system. 4,930,034, Cl. 361-19.000.
Kutschera, Peter: *See*—
Lechtken, Peter; and Kutschera, Peter, 4,929,249, Cl. 8-464.000.
Kuzuhara, Michio; Shibasaki, Jun; St. Louis, Andree; St. Laurent, Christian; and Bedard, Michel, to Toyoda Gosei Co., Ltd.; and Waterville TG, Inc. Door weather strip for motor vehicle. 4,928,431, Cl. 49-479.000.
Kwiatek, Jack: *See*—
Chang, Biau-Hung; Lee, Lester Y.; and Kwiatek, Jack, 4,929,711, Cl. 528-220.000.
Kyle, Donald G., to Atlantic Richfield Company. Method and apparatus of measuring ultrasonic time travel information obtained from logging operations in a well borehole. 4,930,109, Cl. 367-27.000.
Kyogoku, Tetsuo; Ishiyama, Masamitsu; and Mino, Masayuki, to Minolta Camera Kabushiki Kaisha. Document support table with lubricant and method for forming the same. 4,929,980, Cl. 355-75.000.
Kyono, Tetsuyuki; Ohnishi, Seiichiro; Hanano, Tohru; and Hotta, Tohru, to Agency of Industrial Science and Technology. Preform wire for a carbon fiber reinforced aluminum composite material and a method for manufacturing the same. 4,929,513, Cl. 428-611.000.
Kyoritsu Yuki Co., Ltd.: *See*—
Takeda, Hisao; and Kawano, Mutsumi, 4,929,655, Cl. 524-458.000.
Kyowa Hakko Kogyo Co., Ltd.: *See*—
Eguchi, Tamotsu; Oshiro, Takashi; Kuge, Yukihiro; Mochida, Kenichi; and Uwajima, Takayuki, 4,929,551, Cl. 435-106.000.
LaBarge, Robert L., to Aluminum Company of America. Pressure release for carbonated beverage containers. 4,928,844, Cl. 220-207.000.
Laboratoires Biotrol: *See*—
Holtermann, Henri; and Hamelin, Claude, 4,929,245, Cl. 604-338.000.
Laboratoires Chauvin-Blache: *See*—
Coquelet, Claude; Roussillon, Samia; Sincholle, Daniel; Bonne, Claude; and Alazet, Alain, 4,929,635, Cl. 514-438.000.
Ladegourdie, Gerard: *See*—
Torbus, Marek; Jerman, Franz; Ladegourdie, Gerard; Lingemann, Dirk; Seiss, Willi; and Vujevic, Aleksandar, 4,929,649, Cl. 523-145.000.
Lagarde, Robert; Ariagno, Daniel; and Nys, Jacques, to Rhone-Poulenc Specialites Chimiques. Elastomeric silicone binding threads for cookable foodstuff items. 4,929,460, Cl. 426-420.000.
Lahti, Gary P. Portable lifter. 4,929,010, Cl. 294-16.000.
Lai, John T.: *See*—
Kletecka, George; Lai, John T.; and Son, Pyong N., 4,929,653, Cl. 524-96.000.
Laird, Walter J.: *See*—
Halenbeck, Robert; Koths, Kriston; Cowgill, Cynthia; and Laird, Walter J., 4,929,700, Cl. 530-351.000.
Lajovic, Dusan S., to Impact International Pty, Ltd. Method of making a laminated tubular body. 4,928,877, Cl. 229-125.420.
Laminar Fluid Controls, Inc.: *See*—
Feild, Eugene P., 4,928,920, Cl. 251-118.000.
Lampl, Heinz: *See*—
Mayr, Bernhard; and Lampl, Heinz, 4,928,989, Cl. 280-610.000.
Lampotang, Samsun; Gravenstein, Dietrich; Gravenstein, Joachim S.; Gravenstein, Nikolaus; and Banner, Michael J., to University of Florida, The. CO_2 diagnostic monitor. 4,928,687, Cl. 128-207.140.
Lancaster, Gerald M.: *See*—
Laughner, Michael K.; Lancaster, Gerald M.; and Sun, Yun C., 4,929,673, Cl. 525-63.000.
Lancelin, Pierre: *See*—
Cavezzan, Jacques; Frances, Jean-Marc; and Lancelin, Pierre, 4,929,702, Cl. 528-18.000.
Landanger, Patrick: *See*—
Chagneau, Francis; Levasseur, Michel; Landanger, Patrick; Langlais, Frantz; and Rolland, Jean-Jacques, 4,928,679, Cl. 606-62.000.
Landis, Michael E.: *See*—
Aufdembrink, Brent A.; and Landis, Michael E., 4,929,587, Cl. 502-242.000.
Landoll Corporation: *See*—
Bell, Dennis E., 4,928,774, Cl. 172-430.000.
Landos Applications Orthopediques Francaises: *See*—
Chagneau, Francis; Levasseur, Michel; Landanger, Patrick; Langlais, Frantz; and Rolland, Jean-Jacques, 4,928,679, Cl. 606-62.000.
Landriault, L. Steven; Ortloff, Donald J.; and Bollfrass, Charles A., to Hydril Company. Elastomeric guard seal for tubular connections. 4,928,999, Cl. 285-113.000.
Landwehr, Ulrich M.; and Rackwitz, Guenter. Reproducing human posture. 4,928,708, Cl. 128-774.000.
Lang, Hans-Jochen; Hropot, Max; Granzer, Ernold; and Kerekjarto, Bela, to Hoechst Aktiengesellschaft. Benzenesulfonamide derivatives and a process for the preparation thereof. 4,929,643, Cl. 514-603.000.
Lang, Luke C. K.: *See*—
Chung, Paul W.; Gee, Ralph L.; Lang, Luke C. K.; and Saber, Paik, 4,929,918, Cl. 331-10.000.
Langer, Horst G.: *See*—
Khoury, Issam A.; and Langer, Horst G., 4,929,575, Cl. 501-137.000.
Langlais, Frantz: *See*—
Chagneau, Francis; Levasseur, Michel; Landanger, Patrick; Langlais, Frantz; and Rolland, Jean-Jacques, 4,928,679, Cl. 606-62.000.

Langley, Deborah E.: *See*—
Clark, James B.; and Langley, Deborah E., 4,929,365, Cl. 210-754.000.

Langston, Richard D.; Webb, Frances C.; and McBeath, Simon C., to Charcoal Cloth Limited. Wound dressing. 4,928,681, Cl. 128-156.000.

Lanham, Robert L.: *See*—
Gibbons, Charles E.; Marano, Gerald A.; Kittrell, James M.; Whitlock, Allan A.; Lanham, Robert L.; and Evans, Donald, 4,929,476, Cl. 428-34.200.

Lanier, Joel P.; Hall, Tamuel A.; and Moore, Kent R., to University of Tennessee Research Corporation. Exercise apparatus for actively exercising the upper body while passively exercising the lower body. 4,928,957, Cl. 272-72.000.

Laperle, Guy. Weed cutter. 4,928,457, Cl. 56-12.700.

Lapeyre, Pascal: *See*—
Begout, Eric; Bourgeois, Alain; Gueuret, Raymond; and Lapeyre, Pascal, 4,929,962, Cl. 343-786.000.

La Plante, John A.; and Schaefer, Robert D., to Hughes Aircraft Company. Kinematic mount. 4,929,073, Cl. 350-609.000.

Lara, Pedro F., to Atlantic Richfield Company. Transient electromagnetic method for detecting irregularies on conductive containers having variations in jacket thickness. 4,929,896, Cl. 324-240.000.

Large Scale Biology: *See*—
Anderson, Norman G.; and Anderson, Norman L., 4,929,972, Cl. 354-75.000.

Larsen, Alan B., to Hughes Aircraft Company. Process for electrically testing a component in transit to assembly and component test chuck. 4,929,892, Cl. 324-158.00F.

Larsen, Michael R.: *See*—
Link, Donald A.; Hubbard, Dean A.; and Larsen, Michael R., 4,929,919, Cl. 335-38.000.

Larsen, Steven D.: *See*—
Walters, Darrell L.; and Larsen, Steven D., 4,928,410, Cl. 37-117.500.

Larson, David J.: *See*—
Gassman, Max P.; Larson, David J.; and Trampel, Darrell W., 4,928,628, Cl. 119-1.000.

Larson, John E.: *See*—
Danilenko, Michael; Dekarske, Clarence W.; and Larson, John E., 4,930,106, Cl. 365-189.010.

Larsson, Karl O. A. H., to ISG/AG. Breastpump having improved valve mechanism. 4,929,229, Cl. 604-74.000.

Larsson, Lennart; and Andersson, Arne, to AB Akerlund & Rausing. Machine for applying adhesive to an elongate sheet material. 4,928,622, Cl. 118-70.000.

Lassally, Gunter M., to Amstelstaal B.V. Flanged valve. 4,928,923, Cl. 251-221.000.

Lassiter, Perry B., to Premier Refractories & Chemicals Inc. Method of manufacturing cast fused silica articles. 4,929,579, Cl. 501-133.000.

Latge, Christian, to Commissariat a l'Energie Atomique. Cold trap for the purification of a liquid metal having separate trapping zones. 4,928,497, Cl. 62-55.500.

Latimer, Richard G., Jr. Bingo chip dispenser. 4,928,970, Cl. 273-148.00R.

LaTour, Norman E.: *See*—
Evangelista, Donato D.; LaTour, Norman E.; and Kirven, Bobby, 4,928,948, Cl. 271-110.000.

Lauer, Christian: *See*—
Dedden, Hubert; Gieger, Eckhard; and Lauer, Christian, 4,929,829, Cl. 250-208.400.

Laughner, Michael K.; and Ogoe, Samuel A., to Dow Chemical Company, The. Fire retardant impact modified carbonate polymer composition. 4,929,663, Cl. 524-423.000.

Laughner, Michael K., to Dow Chemical Company, The. Polycarbonate modified with a grafted olefin copolymer. 4,929,672, Cl. 525-63.000.

Laughner, Michael K.; Lancaster, Gerald M.; and Sun, Yun C., to Dow Chemical Company, The. Polycarbonate/styrenic blends modified with a grafted olefin copolymer. 4,929,673, Cl. 525-63.000.

Laughner, Michael K., to Dow Chemical Company, The. Impact and chemical resistant polycarbonate blend. 4,929,676, Cl. 525-67.000.

Laughon, Thomas C.; Nicholson, Roy V.; Barreti, Michael E.; and Beckmann, Robert C., to McCalla/Lackey Products Corporation. Wall mounting system. 4,928,913, Cl. 248-224.100.

Laurent, Jean M., to SKF France. Self-centering freewheel mechanism. 4,928,801, Cl. 192-45.100.

Lauritano, Giuseppe. Tool manipulating harmonic balancer. 4,929,111, Cl. 403-16.000.

Lawson, R. Joe: *See*—
Moser, Mark D.; Lawson, R. Joe; Antos, George J.; Wang, Li; and Parulekar, Vivekanand N., 4,929,332, Cl. 208-65.000.
Moser, Mark D.; Lawson, R. Joe; Wang, Li; and Parulekar, Vivekanand N., 4,929,333, Cl. 208-65.000.

Lazarus, Stanley D.: *See*—
Mohajer, Yousef; and Lazarus, Stanley D., 4,929,715, Cl. 528-272.000.

Leaning, Anthony R., to British Telecommunications public limited company. Pattern processing. 4,930,013, Cl. 358-133.000.

Lechtken, Peter; and Kutschera, Peter, to BASF Aktiengesellschaft. Discharge and discharge resist printing using aminoreductones. 4,929,249, Cl. 8-464.000.

Lecocq, Jean-Luc, to Automobiles Peugeot; Automobiles Citroen; and Regie Nationale des Usines Renault. Device for transmitting items of information for an automobile vehicle and a method of using said device. 4,929,941, Cl. 340-825.140.

Ledenbach, Gregory W.; and Allen, Michael J., to Intel Corporation. Architecture for an improved performance of a programmable logic device. 4,930,097, Cl. 364-716.000.

Ledley, Robert S. Methods and apparatus for determining distributions of radioactive materials. 4,929,832, Cl. 250-328.000.

Lee, Anthony L.; Meyer, Howard S.; and Hill, Vern L., to Gas Research Institute. Mixed-solid solution tri-metallic oxide/sulfide catalyst and process for its preparation. 4,929,585, Cl. 502-220.000.

Lee, Chuan; and Kovacs, Kerry, to Mead Corporation, The. Process for producing photosensitive composition capable of forming full color images from a single capsule batch. 4,929,531, Cl. 430-138.000.

Lee, Chung-tien: *See*—
Yang, Chin-lung; and Lee, Chung-tien, 4,928,432, Cl. 51-5.00C.

Lee, Douglas W., to Gas Research Institute. Downhole surge valve for earth boring apparatus. 4,928,775, Cl. 175-19.000.

Lee, Hsiao-Chung. Headband radiophone combination set. 4,930,148, Cl. 379-58.000.

Lee, Jar J.; and Yen, Huan-Wun, to Hughes Aircraft Company. Optical beam former for high frequency antenna arrays. 4,929,956, Cl. 342-376.000.

Lee, Lester Y.: *See*—
Chang, Biau-Hung; Lee, Lester Y.; and Kwiatek, Jack, 4,929,711, Cl. 528-220.000.

Lee, Sae D.: *See*—
Dougherty, Lawrence W.; Lee, Sae D.; and Rogers, Melvin F., 4,930,015, Cl. 358-246.000.

Leep, David A.: *See*—
Babbitt, William R.; Beausoleil, Raymond G.; and Leep, David A., 4,930,133, Cl. 372-32.000.

LeFort, Bernard; Maulat, Jean-Pierre; and Bachomoff, Guy R., to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation (SNECMA). Air tap and engine mount for a turbojet engine. 4,928,483, Cl. 60-226.100.

Legat, Denis: *See*—
Dubots, Patrick; Legat, Denis; and Vic, Raymond, 4,929,047, Cl. 350-96.230.

Leggett & Platt, Incorporated: *See*—
Arft, Dennis E., 4,928,331, Cl. 5-13.000.

Le Goullon, Donald; and Goswami, Kisholoy, to FiberChem, Inc. Fiber optic refractive index sensor using a metal clad. 4,929,049, Cl. 350-96.290.

Legrand, Franz; Lerot, Luc; and De Bruycker, Patricia, to Solvay & Cie (Societe Anonyme). Process for the manufacture of a powder of mixed metal oxides, and mixed metal oxide powders. 4,929,436, Cl. 423-593.000.

Lehto, Ari; and Chen, Frank, to Vaisala Oy. Pressure transducer. 4,928,530, Cl. 73-756.000.

Leib, Kenneth G.; and Sullivan, Edward V., to Grumman Aerospace Corporation. Apparatus for opening and holding a frame and a method of mounting an optical element in a frame. 4,929,056, Cl. 350-321.000.

Leifeld, Ferdinand, to Trutzschler GmbH & Co. KG. Lap evener for a fiber processing machine. 4,928,355, Cl. 19-105.000.

Leland Stanford Junior University, The Board of Trustees of The: *See*—
Kortas, Ricardo G., 4,930,075, Cl. 364-413.060.

Lemons, Kyle E.: *See*—
Bodai, Balazs I.; Grandon, Michael D.; Gilbert, Scott J.; Littlejohn, Douglas J.; Lemons, Kyle E.; Fellows, Richard L.; Barry, Michael R.; and Delapp, Michael D., 4,929,426, Cl. 422-63.000.

Le Mouel, Bernard: *See*—
Abazios, Jean-Luc; Billy, Jean-Claude; and Le Mouel, Bernard, 4,930,127, Cl. 370-110.400.

Lenco Machines & Tool Co.: *See*—
Johnston, Gerald, 4,929,342, Cl. 209-12.000.

Lenoir, Roland: *See*—
Butler, David R.; Snow, George; Sandford, Philip; Neu, Max G.; Villani, Jean P.; Teysaedre, Alain; and Lenoir, Roland, 4,928,746, Cl. 164-362.000.

Lenox, Michael A.: *See*—
Aderholt, Gary L.; and Lenox, Michael A., 4,928,525, Cl. 73-290.00V.

Lent, Kevin C.; Rife, Conwell K., Jr.; Simmons, Gerald P.; and Speck, Albert J., to Caterpillar Paving Products Inc. Control system for a road planer. 4,929,121, Cl. 404-84.000.

Lentz, Carl M.; Mullins, Edward T.; and Gibson, Charles L., to Eastman Kodak Company. Hydrogenation of halonitroaromatic compounds. 4,929,737, Cl. 548-365.000.

Leonard, John F.; and Beam, Jerry E., to United States of America, Air Force. Method of manufacturing heat pipe wicks and arteries. 4,929,414, Cl. 419-2.000.

Leonardi, Giovanni M., to RCA Licensing Corporation. Switch-mode power supply. 4,930,060, Cl. 363-21.000.

Le Parquier, Guy: *See*—
Esterlin, Jacques; Le Parquier, Guy; and Roux, Jean Pierre, 4,928,570, Cl. 89-6.500.

Lerot, Luc: *See*—
Legrand, Franz; Lerot, Luc; and De Bruycker, Patricia, 4,929,436, Cl. 423-593.000.

Lessig, William R., III: *See*—
Elson, Donald E.; Gerke, Burton E., Jr.; Bitzel, Michael E.; Wilder, Bruce A.; Rodowsky, Stanley J., Jr.; Lessig, William R., III; Adams, Jeffrey S.; and Hagan, Todd A., 4,928,346, Cl. 15-338.000.

L'Etat Francais: *See—*
Guezou, Jean-Pierre; and Pichard, Jacques, 4,929,200, Cl. 440-38.000.
Levasseur, Michel: *See—*
Chagneau, Francis; Levasseur, Michel; Landanger, Patrick; Langlais, Frantz; and Rolland, Jean-Jacques, 4,928,679, Cl. 606-62.000.
Lever Brothers Company: *See—*
Emmons, Stuart A.; and Hale, Perry, 4,929,377, Cl. 251-100.000.
Oldenburg, Willem; Hemmes, Simon N.; and Hobbel, Jaap E., 4,929,379, Cl. 252-109.000.
Levine, Anthony H.; and Jaeger, Eduard A., to Krushed Kritter Kompany of Kalifornia, Inc. Novelty figure with attachment means. 4,928,954, Cl. 272-8.00N.
Leyendecker, Joachim; Buerstinghaus, Rainer; Theobald, Hans; Kuenast, Christoph; and Hofmeister, Peter, to BASF Aktiengesellschaft. 2-tert-butyl-5-isoxazolylmethylthio-3(2H)-pyridazin-3-one. 4,929,617, Cl. 514-252.000.
LGZ Landis & Gyr Zug AG: *See—*
Popovic, Radivoje, 4,929,993, Cl. 357-27.000.
Li, Shing-Lam, to Antibes, Inc. Aerial toy with on-board signaling device. 4,929,212, Cl. 446-47.000.
Licentia Patent-Verwaltungs GmbH: *See—*
ter Hasebrg, Jan L.; Nedwig, Joachim; and Kruse, Klaus-Dieter, 4,929,842, Cl. 250-551.000.
Liebel-Flarsheim Company: *See—*
Dieterlen, Paul E.; and Mustain, Lewis B., 4,930,147, Cl. 378-176.000.
Liebermann, Ron B. Inflatable enclosure and means to inflate same. 4,929,214, Cl. 446-221.000.
Liebson, Wilbur, to United States of America, Army. Thermal mask for cryogenic detectors in a thermal imaging device. 4,929,834, Cl. 250-352.000.
Liedtke, Kurt: *See—*
Focke, Heinz; and Liedtke, Kurt, 4,929,226, Cl. 493-343.000.
Lifecor, Inc.: *See—*
Heilman, Marlin S.; Brandt, Arlan J.; Bowling, Larry D.; and Russial, Joseph F., 4,928,690, Cl. 128-421.000.
Lilienthal, Cal A.; and Christensen, Ronald L., to Purethane Incorporated. Armrest for vehicles and method of making same. 4,929,017, Cl. 296-153.000.
Lincoln Electric Company, The: *See—*
Blankenship, George D., 4,929,811, Cl. 219-121.540.
Lindblom, Ragnvald E.; and Rothman, Ulf S. Method of treating interferon sensitive diseases, and a method and device for preparing γ-interferon containing preparation. 4,929,443, Cl. 424-85.500.
Lindee, Scott A., to Formax, Inc. Molding mechanism for rod-shaped food product. 4,928,591, Cl. 99-485.000.
Linden, Olavi, to Fiskars Oy Ab. Device for sharpening knives. 4,928,436, Cl. 51-80.0BS.
Lindner, Christian: *See—*
Nouvertne, Werner; Gielen, Franz-Josef; Tacke, Peter; Grigo, Ulrich; Quiring, Bernd; and Lindner, Christian, 4,929,674, Cl. 325-66.000.
Lindner, Georg H., to Atochem North America, Inc. Apparatus for coating a substrate. 4,928,627, Cl. 118-718.000.
Lindner, Werner; Becker, Benedikt; Steffens, Robert; Wachendorff-Neumann, Ulrike; Brandes, Wilhelm; Stendel, Wilhelm; and Dutzmann, Stefan, to Bayer Aktiengesellschaft. Pest-combating agents based on substituted 1,4-naphthoquinones and new substituted 1,4-naphthoquinones. 4,929,642, Cl. 514-510.000.
Lindroos, Gunnar: *See—*
Olin, Henry; Lindroos, Gunnar; and Oldfelt, Sven, 4,928,326, Cl. 4-300.000.
Lindsay, Mitchell H.; and Kerr, Walter B., to United States of America, Air Force. Fuel supply device for supplying fuel to an engine combustor. 4,928,491, Cl. 60-734.000.
Lindstrom, Paul R.: *See—*
Carlson, David K.; and Lindstrom, Paul R., 4,928,626, Cl. 118-715.000.
Lingemann, Dirk: *See—*
Torbus, Marek; Jerman, Franz; Ladegourdie, Gerard; Lingemann, Dirk; Seiss, Willi; and Vujevic, Aleksandar, 4,929,649, Cl. 523-145.000.
Lingg, Jean M.: *See—*
Willyard, Marvin R.; and Lingg, Jean M., 4,929,464, Cl. 426-549.000.
LINGL GmbH & Co. KG: *See—*
Paul, Ernst, 4,929,177, Cl. 432-11.000.
Link, Donald A.; Hubbard, Dean A.; and Larsen, Michael R., to Eaton Corporation. Twin unit circuit breaker with improved magnet structure. 4,929,919, Cl. 335-38.000.
Lionetto, Gene; and Brown, Stephen, to M/A-Com Omni Spectra, Inc. Coaxial connector assembly. 4,929,188, Cl. 439-349.000.
Lippens, Christiaan A. C.; and Naaktgeboren, Adrianus, to Ford New Holland, Inc. Agricultural baler with six stroke feeder mechanism. 4,928,462, Cl. 56-341.000.
Lisec, Peter. Apparatus for heating the marginal zone of glass sheets. 4,929,814, Cl. 219-388.000.
Lisega GmbH: *See—*
Hardtke, Hans H., 4,928,911, Cl. 248-74.100.
Zachiesche, Lothar, 4,928,799, Cl. 188-314.000.
Lissel, Norbert: *See—*
Binarsch, Jurgen; Bode, Jurgen; Danne, Lutz; and Lissel, Norbert, 4,930,040, Cl. 361-154.000.
Litef GmbH: *See—*
Kleinschmidt, Michael, 4,930,085, Cl. 364-449.000.
Lithium Corporation of America: *See—*
Frianeza-Kullberg, Teresita C.; and Barnette, Darrish W., 4,929,588, Cl. 502-402.000.
Littlejohn, Douglas J.: *See—*
Bodai, Balazs I.; Grandon, Michael D.; Gilbert, Scott J.; Littlejohn, Douglas J.; Lemons, Kyle E.; Fellows, Richard L.; Barry, Michael R.; and Delapp, Michael D., 4,929,426, Cl. 422-63.000.
Litton Systems, Inc.: *See—*
Burstyn, Herschel, 4,929,080, Cl. 356-338.000.
Liu, Benjamin Y. H.; and Szymanski, Wladyslaw W., to University of Minnesota, Regents of the. System for airborne particle measurement in a vacuum. 4,928,537, Cl. 73-863.860.
Liu, Kang-Chien: *See—*
Chern, Ji-Wang; Liu, Kang-Chien; and Chen, Chia-Yin, 4,929,728, Cl. 544-284.000.
Livi, Vittorio, to FIAM S.r.l. Piece of furniture made of glass and the like having a resting profile member of rubber. 4,929,488, Cl. 428-192.000.
Lloyd, David J.: *See—*
Jin, Iljoon; and Lloyd, David J., 4,929,421, Cl. 420-545.000.
LMB Hand Rehab Products: *See—*
Barber, Lois M., 4,928,677, Cl. 128-87.00R.
Lobley, Derek G.; and Pinder, Kenneth. Catalytic generation of chlorine dioxide. 4,929,434, Cl. 423-479.000.
Lockett, Michael J.; and Victor, Richard A., to Union Carbide Industrial Gases Technology Inc. Structured column packing with liquid holdup. 4,929,399, Cl. 261-112.200.
Lockheed Missiles & Space Company, Inc.: *See—*
Mercado, Romeo I., 4,929,071, Cl. 350-463.000.
Lockwood, George S., to Ocean Farms of Hawaii Limited Partnership. Method and apparatus for constructing and moving long pipelines. 4,929,124, Cl. 405-165.000.
Lodder, Bernhard; Severiens, Hendrik; van Houten, Jan A.; and van Dijk, Berend J. Method of locating an electrical conductor between a first extruded tube and an extruded lining. 4,929,408, Cl. 264-149.000.
Loftis, Jerry W.: *See—*
Svyatsky, Eduard; Loftis, Jerry W.; and Faber, Thomas, 4,928,946, Cl. 271-10.000.
Logan, Kenneth C. Convertible running shoes/roller skates. 4,928,982, Cl. 280-11.220.
Logan, Robert T.: *See—*
Redpath, James; Logan, Robert T.; McFadzen, David B.; and Roy, Robert G., 4,929,636, Cl. 514-443.000.
Lone Star Industries, Inc.: *See—*
Muszynski, Larry C., 4,928,736, Cl. 138-178.000.
Long, Jacques; and Perrillat-Amede, Denis, to Societe Anonyme dite: Alcatel Cit. Vacuum pump. 4,929,151, Cl. 415-177.000.
Lontex Corporation: *See—*
Nathan, Efraim, 4,928,323, Cl. 2-406.000.
Lopiccolo, Mario T.: *See—*
Wiegand, Walter J.; Swindal, James L.; Swarts, Richard E.; Bullis, Robert H.; Lopiccolo, Mario T.; Grantham, Daniel H.; and Foyt, Arthur G., 4,930,042, Cl. 361-280.000.
L'Oreal: *See—*
Cotteret, Jean; and Grollier, Jean F., 4,929,439, Cl. 424-59.000.
Gueret, Jean-Louis, 4,929,108, Cl. 401-126.000.
Lorence, Brian S.; Phelps, Richard A.; and Grabowski, David N., to Chivas Products Limited. Bilateral beverage container holder. 4,928,865, Cl. 224-275.000.
Lorenzo, John L.: *See—*
Ramsey, James S.; and Lorenzo, John L., 4,928,949, Cl. 271-111.000.
Loreto, Wilfredo P.: *See—*
Ramos, Rolando P.; Loreto, Wilfredo P.; and Vulich, Yordan, 4,928,639, Cl. 51-284.00E.
Lotz, Horst K.; and Thomma, Gunther, to Aute Gesellschaft fuer autogene Technik mbH. Band casting-setting-burn-cutting machine in a line-like layout. 4,928,932, Cl. 266-58.000.
Louis Berkman Company, The: *See—*
Meriwether, Jon D., 4,928,617, Cl. 114-267.000.
Lovik, Craig J. Balloon sculpturing methods, apparatus and products. 4,929,215, Cl. 446-226.000.
Lowden, Richard A.: *See—*
Besmann, Theodore M.; and Lowden, Richard A., 4,929,328, Cl. 204-279.000.
Lowery, Richard E.; Fu, Chia M.; and Maholland, Michael K., to Phillips Petroleum Company. Treatment of spent cracking catalysts. 4,929,336, Cl. 208-120.000.
Lu, Chin S. Spring-loaded seat assembly. 4,929,025, Cl. 297-452.000.
Lubra Sheet Corporation: *See—*
Hatch, William R.; and Foster, John W., 4,929,370, Cl. 252-12.200.
Lucas, Gary H., to Integrated Tech Systems, Inc. Watering system for greenhouse. 4,928,889, Cl. 239-751.000.
Lucas Industries public limited company: *See—*
Farr, Glyn P. R., 4,929,037, Cl. 303-116.000.
Harrison, Anthony W., 4,928,797, Cl. 188-156.000.
Watson, John C.; Gaskill, Stephen P.; Russell, David F.; and Burns, Robert I. D., 4,928,798, Cl. 188-218.0XL.
Luetkens, Melvin L., Jr.; McKenna, Steve T.; and Melquist, John L., to Amoco Corporation. Alcohol conversion. 4,929,763, Cl. 568-402.000.
Luitje, William V.; and McCambridge, John M., to Chrysler Corporation. Vehicle serial bus, mechanical instrument cluster odometer therefor. 4,930,094, Cl. 364-561.000.

Lulay, Eugen, to Hofmann Werkstatt-Technik GmbH. Arrangement for continuously compensating for unbalance on a rotary member. 4,928,548, Cl. 74-573.00F.

Lunardi, Pietro. Method for building large span tunnels by means of a cellular arch. 4,929,123, Cl. 405-150.000.

Lund Industries, Inc.: *See*—
Eke, Alan B., 4,929,013, Cl. 296-91.000.

Lundgren, Bengt; and Wallner, Anders. Method and device for mammographic stereotactic punction of pathological lesions in the female breast. 4,930,143, Cl. 378-37.000.

Lunke, Manfred; Falz, Ulrich; and Walter, Jurgen, to Hackforth GmbH & Co., KG. Resilient shaft coupling. 4,929,115, Cl. 403-228.000.

Luoma, Warren L.; Martin, Ronald G.; and Breault, Richard D., to International Fuel Cells Corp. Electrochemical cell assembly. 4,929,517, Cl. 429-34.000.

Luscombe, Brian M.: *See*—
Hewett, Richard H.; and Luscombe, Brian M., 4,929,271, Cl. 71-94.000.

Lushinsky, Gene A.: *See*—
Batra, Surinder P.; Hammer, William E.; Lushinsky, Gene A.; Marquart, David W.; Schwane, Walter H.; and Ziecina, Frederick J., 4,930,069, Cl. 364-200.000.

Luther, Hans W.: *See*—
Sabranski, Udo; Luther, Hans W.; Sabinski, Horst; and Winkelmann, Jurgen, 4,928,598, Cl. 102-467.000.

Luthra, Narender P.: *See*—
Heifetz, Aaron H.; Wolfe, Richard A.; Braatz, James A.; and Luthra, Narender P., 4,929,706, Cl. 528-49.000.

Lutsenko, Georgy G.: *See*—
Tikhonovich, Vadim I.; Pavljuk, Vladimir D.; Vinokur, Bertold B.; Kondratjuk, Stanislav E.; Lutsenko, Georgy G.; Edemsky, Vladimir K.; Kiselev, Vladimir B.; Karasev, Nikolai M.; and Myakishev, Anatoly K., 4,929,416, Cl. 420-12.000.

Luttinger, Lionel B., to Drew Chemical Corporation. Recovery of metal values from ores. 4,929,274, Cl. 423-25.000.

Lynn, Peter P. A. Solder leveller. 4,928,869, Cl. 228-20.000.

Lynch, W. Bryan: *See*—
Wallace, W. Edward; Smith, H. Kevin; Lynch, W. Bryan; Craig, Raymond S.; and Pourarian, Fiaz, 4,928,496, Cl. 62-46.200.

Lyon, David H.: *See*—
Fansler, Kevin S.; and Lyon, David H., 4,928,573, Cl. 89-14.400.

M/A-Com Omni Spectra, Inc.: *See*—
Lionetto, Gene; and Brown, Stephen, 4,929,188, Cl. 439-349.000.

Ma, Ulysses: *See*—
Tucker, Kay L.; and Ma, Ulysses, 4,929,423, Cl. 420-561.000.

Maass, Freimut. Snow glider. 4,928,983, Cl. 280-18.000.

Maass, Hans: *See*—
Eckold, Gerd-Jurgen; and Maass, Hans, 4,928,370, Cl. 29-243.500.

Macaione, Anthony F.; and Wright, John V., to Reiton Corporation. Precision temperature sensor. 4,930,134, Cl. 372-33.000.

MacDonald, Lindsay W., to Crossfield Electronics Limited. Apparatus for generating a two-dimensional coloured display. 4,930,010, Cl. 358-78.000.

Machacek, Zdenek: *See*—
Tilman, Paul A.; Machacek, Zdenek; and Scott, Richmond, 4,929,487, Cl. 428-163.000.

Machida, Haruchika: *See*—
Yuchi, Sadataka; Machida, Haruchika; Matsuoka, Naoya; and Kikuchi, Masamichi, 4,930,095, Cl. 364-571.010.

Machida, Yoshimasa; Negi, Shigeto; Kamiya, Takashi; Komatu, Yuuki; Sugiyama, Isao; Kai, Yasunobu; Nakamura, Takaharu; Naito, Toshihiko; Kitoh, Kyosuke; Katsu, Kanemasa; and Yamauchi, Hiroshi, to Eisai Co., Ltd. Thiadiazolylacetamide cephem derivatives. 4,929,612, Cl. 514-202.000.

Machler, Franz: *See*—
Demuth, Robert; Stabeli, Paul; Waber, Rene; Grundler, Christoph; and Machler, Franz, 4,928,353, Cl. 19-65.00A.

MacMillan, Hugh F.: *See*—
Costello, Kenneth A.; and MacMillan, Hugh F., 4,929,867, Cl. 313-525.000.

Madden, Raymond. Weight lifting apparatus. 4,928,961, Cl. 272-123.000.

Maeda, Koichi: *See*—
Kitayama, Shinichiro; Adachi, Teruho; Ueda, Masahiro; Aoki, Yuichi; Shiiki, Satoshi; Takigawa, Akio; Yoshida, Motoaki; Imamura, Naoya; Maeda, Koichi; and Kayanoki, Hisayuki, 4,929,523, Cl. 430-4.000.

Maeda, Satoru; Noguchi, Yasushi; Yasuda, Kazunori; and Takano, Shyunsuke, to Sony Corporation. Method and apparatus for processing a still picture signal. 4,930,014, Cl. 358-209.000.

Maehashi, Yukio: *See*—
Katayose, Tsuyoshi; and Maehashi, Yukio, 4,930,068, Cl. 364-200.000.

Maekawa, Masanori: *See*—
Mizutani, Minoru; Kikuchi, Hiroshi; Watanabe, Shoichi; Hayashi, Kuniharu; and Maekawa, Masanori, 4,929,102, Cl. 400-248.000.

Maestro, Patrick: *See*—
Iltis, Alain; and Maestro, Patrick, 4,929,574, Cl. 501-137.000.

Maeyama, Hachiro, to Tsuyama Mfg. Co., Ltd. Means for detecting damage to the card connecting the photosensor and main body pulsimeter. 4,929,825, Cl. 250-221.000.

Maezawa, Shigenari: *See*—
Saigo, Akira; Maezawa, Shigenari; Kageyama, Tomoaki; Ishikura, Keizaburo; Sera, Akio; and Suehiro, Junji, 4,929,903, Cl. 324-544.000.

Magal Security Systems, Ltd.: *See*—
Porat, Chaim, 4,929,926, Cl. 340-541.000.

Magin, Berthold, to MTM Obermaier GmbH & Co. KG. Process for the wet treatment of textile material. 4,928,338, Cl. 8-149.100.

Magna International Inc.: *See*—
Bartczak, Andrzej; and Cetnar, Roman, 4,929,007, Cl. 292-336.300.

Magnetic Peripherals Inc.: *See*—
Shadzi, Bahram; and Weaver, Christopher A., 4,929,499, Cl. 428-336.000.

Mahl, Robert R., to Chesapeake Display and Packaging Company. Coupler assembly for connecting corrugated sheet material. 4,929,116, Cl. 403-263.000.

Mahlkow, Hartmut; Romer, Michael; Rosskamp, Gunther; Seidenspinner, Hubert-Matthias; Stein, Ludwig; and Strache, Waltraud, to Schering Aktiengesellschaft. Process for the adhesive metallization of synthetic materials. 4,929,422, Cl. 427-57.000.

Mahmood, Tario, to American Cyanamid Company. Emulsifiable concentrates of malathion. 4,929,608, Cl. 514-122.000.

Maholland, Michael K.: *See*—
Lowery, Richard E.; Fu, Chia M.; and Maholland, Michael K., 4,929,336, Cl. 208-120.000.

Mahulikar, Deepak: *See*—
Pryor, Michael J.; Fister, Julius C.; Singhdeo, Narendra N.; Mahulikar, Deepak; and Cherukuri, Satyam C., 4,929,516, Cl. 428-620.000.

Maisel, Britta: *See*—
Stephani, Trutz-Ulrich; Mohr, Dieter; Maisel, Britta; and Frass, Werner, 4,929,534, Cl. 430-191.000.

Makhlouf, Samir B. Torque master. 4,928,558, Cl. 81-57.300.

Makino, Hiroyuki: *See*—
Urai, Muneharu; Makino, Hiroyuki; and Shimada, Makoto, 4,929,304, Cl. 156-245.000.

Mallinckrodt, Inc.: *See*—
Connaughton, James M., Jr.; Sexton, James E.; and Hegener, James A., 4,929,455, Cl. 426-92.000.

Maloney, Joseph J., to Reliance Electric Company. Lubrication apparatus. 4,928,795, Cl. 184-7.400.

Mamke, Kevin R., to Halliburton Company. Retrievable bridge plug and packer. 4,928,762, Cl. 166-192.000.

Mammato, Donald: *See*—
Spak, Mark A.; Mammato, Donald; Durham, Dana; and Jain, Sangya, 4,929,536, Cl. 430-325.000.

Man Design Co., Ltd.: *See*—
Shimizu, Giichiro; Shimizu, Misao; Takeuchi, Hajime; Okuyama, Toshiharu; and Wakatsuki, Yoshio, 4,930,096, Cl. 364-550.000.

Manabe, Hajime: *See*—
Murata, Yoshiyuki; and Manabe, Hajime, 4,928,563, Cl. 84-726.000.

Manabe, Mitsuo: *See*—
Karube, Norio; Egawa, Akira; Yamazaki, Etsuo; Iehisa, Nobuaki; and Manabe, Mitsuo, 4,930,135, Cl. 372-33.000.

Mannesmann AG: *See*—
Hendrischk, Wolfgang, 4,929,103, Cl. 400-124.000.
Osarek, Werner; Pempera, Franz G.; and Schonert, Dieter, 4,928,717, Cl. 134-64.00R.
Pleschiutschnigg, Fritz-Peter; Moellers, Gerd; Eberhardt, Hans-Georg; Rahmfeld, Werner; Parschat, Lothar; and Ehrenberg, Hans-Juergen, 4,928,747, Cl. 164-418.000.

Mannesmann Rexroth GmbH: *See*—
Nikolaus, Heinrich, 4,928,487, Cl. 60-414.000.

Manoury, Philippe; and Saarmets, Alfred, to Synthelabo. 1-1[(2-pyrimidinyl)amino-alkyl]piperidines, their preparation and their application in therapy. 4,929,621, Cl. 514-275.000.

Mansour, Tahir M., to Ford Motor Company. Surface quality analyzer apparatus and method. 4,929,846, Cl. 250-571.000.

Mantingh, Jan. Mobile earth mover bowl with loading rotor. 4,928,409, Cl. 37-9.000.

Marano, Gerald A.: *See*—
Gibbons, Charles E.; Marano, Gerald A.; Kittrell, James M.; Whillock, Allan A.; Lanham, Robert L.; and Evans, Donald, 4,929,476, Cl. 428-34.200.

Marathon Oil Company: *See*—
Falk, David O., 4,928,763, Cl. 166-250.000.

Marcos, Juan A.: *See*—
Pollak, Robert R.; and Marcos, Juan A., 4,928,482, Cl. 60-39.161.

Marelin, Miklos B.: *See*—
Hinnen, Hans R.; and Marelin, Miklos B., 4,928,738, Cl. 140-93.400.

Margerum, Wayne R. Automatic wet tank drain valve. 4,928,724, Cl. 137-204.000.

Margosiak, John S.: *See*—
Emadi, Atahusain E.; Green, Eric T.; Margosiak, John S.; Mignogna, Daniel J.; and Smith, Dennis E., 4,929,184, Cl. 439-681.000.

Marin-Ayral, Rose-Marie: *See*—
Brun, Gerard; Marin-Ayral, Rose-Marie; Maurin, Maurice; Pistoulet, Bernard; and Tedenac, Jean-Claude, 4,929,282, Cl. 136-239.000.

Marinaccio, Paul J.: *See*—
Smirlock, Martin E.; Ribich, William A.; Marinaccio, Paul J.; and Sawaf, Bernard E., 4,928,575, Cl. 89-36.020.

Markyvech, Ronald K.; and Genise, Thomas A., to Eaton Corporation. Dual pressure pressurized fluid actuated shifting mechanism. 4,928,544, Cl. 74-335.000.

Marles, Robert: *See*—
Smith, Raymond D.; and Marles, Robert, 4,930,046, Cl. 361-393.000.

Marquart, David W.: *See*—
Batra, Surinder P.; Hammer, William E.; Lushinsky, Gene A.; Marquart, David W.; Schwane, Walter H.; and Ziecina, Frederick J., 4,930,069, Cl. 364-200.000.

Marques, Jose A., to Cordis Corporation. Arterial/venous simulator. 4,928,528, Cl. 73-40.000.

Marquez, Edmundo M.; Nowak, Jean-Francois; and Robles, Antonio, to Intevep, S. A. Corrosion resistance of low carbon steels in a vanadium, sulfur and sodium environment at high temperatures. 4,929,473, Cl. 427-252.000.

Marshall, Allen S., to Brockington and Marshall. Bifrustoconical beverage container, lid, multi-secitonal straw, and fastening devices. 4,928,876, Cl. 229-103.100.

Martel, Brian J.: *See*—
Clark, John; Martel, Brian J.; and Murray, James S., 4,929,877, Cl. 318-560.000.

Marti, Jaime S. Machine for unscrambling and positioning containers. 4,928,808, Cl. 198-397.000.

Martin, Edward S.; and Wieserman, Larry F., to Aluminum Company of America. Metal oxide/hydroxide particles coated with phosphate esters. 4,929,589, Cl. 502-406.000.

Martin, James F. Facsimile transmission of photographic images. 4,930,020, Cl. 358-400.000.

Martin Marietta Energy Systems, Inc.: *See*—
Besmann, Theodore M.; and Lowden, Richard A., 4,929,328, Cl. 204-279.000.

Martin, Ronald G.: *See*—
Luoma, Warren L.; Martin, Ronald G.; and Breault, Richard D., 4,929,517, Cl. 429-34.000.

Marusak, Thomas J.: *See*—
Schnebly, John; and Marusak, Thomas J., 4,928,369, Cl. 29-24.500.

Marusawa, Hiroshi: *See*—
Setoi, Hiroyuki; Kuroda, Akio; Tanaka, Hirokazu; Hirai, Hideo; Marusawa, Hiroshi; and Hashimoto, Masashi, 4,929,639, Cl. 514-452.000.

Maruta, Keiichi; Ueda, Takashi; and Watanabe, Yasuhiko, to Ricoh Company, Ltd. Thermosensitive recording material. 4,929,590, Cl. 503-207.000.

Maruta, Kenji: *See*—
Masaka, Mitusuke; Hatanaka, Koji; Maruta, Kenji; and Okazaki, Seiji, 4,929,813, Cl. 219-270.000.

Maruyama, Tadashi: *See*—
Matsumoto, Osamu; Maruyama, Tadashi; Murata, Hiroyoshi; Abe, Isao; Shigematsu, Tomohisa; Shinada, Kazuyoshi; Suzuki, Yasoji; and Kobayashi, Ichiro, 4,930,105, Cl. 365-185.000.

Marvin Glass & Associates: *See*—
Morris, Lamont C.; Kuna, Wayne A.; and Terzian, Rouben T., 4,929,216, Cl. 446-324.000.

Masaka, Mitusuke; Hatanaka, Koji; Maruta, Kenji; and Okazaki, Seiji, to Jidosha Kiki Co., Ltd.; and Hitachi Metals, Ltd. Glow plug for diesel engine. 4,929,813, Cl. 219-270.000.

Masaki, Takayoshi: *See*—
Kitagawa, Kazuo; Komatsu, Fumiaki; Masaki, Takayoshi; Sawada, Yoshihisa; and Inada, Eiichi, 4,929,394, Cl. 252-633.000.

Masaki, Takeshi; Kawata, Koichi; and Sakagaito, Yukuo, to Matsushita Electric Industrial Co., Ltd. Apparatus for working curved surfaces on a workpiece. 4,928,435, Cl. 51-55.000.

Maschinenbau Oppenweiler Binder GmbH & Co.: *See*—
Heina, Karl-Fritz; Schwarz, Horst; and Weber, Wolfgang, 4,928,953, Cl. 271-185.000.

Maschinenfabrik Rieter AG: *See*—
Demuth, Robert; Staheli, Paul; Waber, Rene; Grundler, Christoph; and Machler, Franz, 4,928,353, Cl. 19-65.00A.
Symon, Georg, 4,928,896, Cl. 242-43.00R.

Maschmeyer, Richard O.: *See*—
Carpenter, Larry L.; Hagerty, Robert J.; Maschmeyer, Richard O.; Morrell, Mark L.; and Schrauth, Peter A., 4,929,265, Cl. 65-64.000.

Maslak, Chris E., to General Electric Company. Water and steam injection in cogeneration system. 4,928,478, Cl. 60-39.050.

Massa, Ted R.; and Siddle, David R., to Kennametal Inc. Collet tool. 4,928,373, Cl. 29-278.000.

Massachusetts Institute of Technology: *See*—
Wrighton, Mark S., 4,929,313, Cl. 204-153.100.

Massardo, Pietro; Bettarini, Franco; Piccardi, Paolo; and Rama, Franco, to Istituto Guido Donegani. Process for preparing polyhalogenated carbinols. 4,929,772, Cl. 568-812.000.

Massey-Ferguson Services N.V.: *See*—
Tite, Raymond C., 4,928,858, Cl. 222-312.000.

Mast, Fred; and Knus, Jean A., to GRETAG Aktiengesellschaft. Measuring head. 4,929,084, Cl. 356-446.000.

Masuda, Takashi; and Sekiguchi, Kyoji, to Canon Kabushiki Kaisha. Ophthalmic measuring apparatus. 4,929,076, Cl. 351-212.000.

Masuda, Yukio: *See*—
Sugiura, Susumu; Kouzato, Yasuo; and Masuda, Yukio, 4,930,007, Cl. 358-75.000.

Matayoshi, Yutaka; Yoshimura, Toru; Kamegaya, Shigeru; and Hamai, Kyugo, to Nissan Motor Co., Ltd. Operating arrangement for internal combustion engine poppet valves and the like. 4,928,650, Cl. 123-90.240.

Mather, John C.; and Young, Jerald A., to Rockwell International Corp. Temporary soldering aid for manufacture of printed wiring assemblies. 4,928,387, Cl. 29-840.000.

Mathis, Walter. Apparatus for dry printing onto a workpiece using a hot embossing film and an embossing die. 4,928,588, Cl. 101-9.000.

Matre, Daniel A.: *See*—
Campanelli, Anthony S.; and Matre, Daniel A., 4,928,424, Cl. 47-1.010.

Matsubaguchi, Satoshi: *See*—
Yamada, Takashi; Nomura, Masaaki; Yamamoto, Ryoichi; Matsubaguchi, Satoshi; and Nahara, Akira, 4,929,320, Cl. 204-192.200.

Matsubara, Saburo; Gohshi, Yoshihiro; Kobayashi, Seizo; and Usui, Katsumi, to Nippon Oil Co., Ltd. Preparation method of masterbatch composition for thermoplastic resin modification. 4,929,680, Cl. 525-240.000.

Matsubara, Yuji: *See*—
Hosshi, Akira; Akima, Hideo; Shimanuki, Haruki; and Matsubara, Yuji, 4,930,083, Cl. 364-426.020.

Matsuda, Hiroshi: *See*—
Sakai, Kunihiro; Miyazaki, Toshihiko; Eguchi, Ken; Kawada, Haruki; Tomida, Yoshinori; Kimura, Toshiaki; Matsuda, Hiroshi; Takimoto, Kiyoshi; and Saito, Kenji, 4,929,524, Cl. 430-56.000.

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Matsuhashi, Yuji: *See*—
Shibahara, Seiji; Takahashi, Yukiko; Matsuhashi, Yuji; Hachisu, Mitsugu; Kondo, Shinichi; Takeuchi, Tomio; and Aoyagi, Takaaki, 4,929,633, Cl. 514-423.000.

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Matsumoto, Osamu; Maruyama, Tadashi; Murata, Hiroyoshi; Abe, Isao; Shigematsu, Tomohisa; Shinada, Kazuyoshi; Suzuki, Yasoji; and Kobayashi, Ichiro, to Kabushiki Kaisha Toshiba. Nonvolatile semiconductor memory device with a double gate structure. 4,930,105, Cl. 365-185.000.

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Matsuo, Koujirou: *See*—
Yoshinaka, Minoru; Matsuo, Koujirou; Koike, Kiichi; Suzuki, Yoshie; and Sugimoto, Mansaku, 4,929,518, Cl. 429-54.000.

Matsuo, Teruo; Ihara, Tadayoshi; and Oyamada, Yoshinori, to Hitachi, Ltd. Method of aging cathode-ray tube. 4,929,209, Cl. 445-6.000.

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Yamada, Hiroshi; Nakano, Ryo; Matsuo, Yasutoshi; and Mikami, Seiichi, 4,930,005, Cl. 358-36.000.

Matsuoka, Masami: *See*—
Shishido, Kihachi; Matsuoka, Masami; Ishihara, Noriyuki; and Tamura, Masahiro, 4,929,479, Cl. 428-35.200.

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Yuchi, Sadataka; Machida, Haruchika; Matsuoka, Naoya; and Kikuchi, Masamichi, 4,930,095, Cl. 364-571.010.

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Ishii, Susumu; and Matsushima, Hideyuki, 4,928,358, Cl. 24-431.000.

Matsushima, Kouji, to Fujitsu Limited. Cordless telephone communication system. 4,930,149, Cl. 379-61.000.

Matsushita, Akio: *See*—
Takematsu, Tetsuo; Yakeuchi, Yasutomo; Takenaka, Mitsuaki; Takamura, Seiji; and Matsushita, Akio, 4,929,273, Cl. 71-118.000.

Matsushita Electric Industrial Co., Ltd.: *See*—
Eda, Kazuo; Miwa, Tetsuji; and Taguchi, Yutaka, 4,930,044, Cl. 361-313.000.
Kanamori, Katsuhiro; Kanno, Yoshimitsu; Kurosawa, Toshiharu; Kawakami, Hidehiko; Naka, Motohiko; and Kotera, Hiroaki, 4,929,978, Cl. 355-38.000.
Kato, Makoto; Saimi, Tetsuo; and Ohara, Shunji, 4,929,823, Cl. 250-201.500.
Masaki, Takeshi; Kawata, Koichi; and Sakagaito, Yukuo, 4,928,435, Cl. 51-55.000.
Namba, Mitsuo; and Uematsu, Reppei, 4,928,728, Cl. 137-486.000.
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Matsushita, Yoshikazu: *See*—
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Matsuyama, Kazuo: *See*—
Komai, Takeshi; Matsuyama, Kazuo; and Honma, Isao, 4,929,747, Cl. 558-263.000.

Matthews, Charles W.; Batman, Eric S.; and King, Jeffrey F., to Ethyl Corporation. Aluminum phenoxide catalyst removal. 4,929,770, Cl. 568-756.000.

Matthews, Donald P.; McCarthy, James R.; and Whitten, Jeffrey P., to Merrell Dow Pharmaceuticals. Process for preparing heteroaromatic methyl)-2,2'-bi-1H-imidazoles. 4,929,744, Cl. 548-202.000.

Matthews, Leonard A.: *See*—
Powers, William J., III; Matthews, Leonard A.; and Jao, Tze-Chi, 4,929,373, Cl. 252-33.000.

Matthews, Michael: *See*—
Truchsess, Joseph; and Matthews, Michael, 4,929,826, Cl. 250-221.000.

Matz, Richard; and Zirrgiebel, Jutta, to Siemens Aktiengeseilschaft. Insulating arrangement for optical insulation of integrated components and the method of manufacture. 4,929,515, Cl. 428-614.000.

Maulat, Jean-Pierre: *See*—
LeFort, Bernard; Maulat, Jean-Pierre; and Bachomoff, Guy R., 4,928,483, Cl. 60-226.100.

Maurin, Maurice: *See*—
Brun, Gerard; Marin-Ayral, Rose-Marie; Maurin, Maurice; Pistoulet, Bernard; and Tedenac, Jean-Claude, 4,929,282, Cl. 136-239.000.

Maury, Hans-Dietmar; and Bualowski, Wolfgang, to O&K Orenstein & Koppel Aktiengesellschaft. Method for the heat treatment of finely granular material. 4,929,178, Cl. 432-14.000.

Maxwell, Peter C.: *See*—
Barer, Sol J.; Maxwell, Peter C.; and Hsieh, Jih-Han, 4,929,396, Cl. 562-595.000.

Maxwell, Thomas P., to Minnesota Mining and Manufacturing Company. Intravascular blood parameter measurement system. 4,928,694, Cl. 128-637.000.

May & Baker Limited: *See*—
Hewett, Richard H.; and Luscombe, Brian M., 4,929,271, Cl. 71-94.000.

Mayer, Peter: *See*—
Barshay, Stanley F.; and Mayer, Peter, 4,928,840, Cl. 220-8.000.

Mayr, Bernhard; and Lampl, Heinz, to Head Sportgeraete Gesellschaft m.b.H. & Co. OHG. Ski having a core comprising angled profiles. 4,928,989, Cl. 280-610.000.

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Mays, Roscoe, Jr.: *See*—
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Mazanek, Jan; von Gizycki, Ulrich; Muller, Hanns P.; Wienkenhover, Martin; Wieser, Karl-Heinz; Paulat, Volker; Theuer, Werner; and Muller, Walter, to Bayer Aktiengesellschaft. New polyisocyanate-polyaddition compounds, a process for their preparation and their use for the dispersion of solids. 4,929,705, Cl. 528-49.000.

Mazda Motor Corporation: *See*—
Shinya, Yoshiyuki; Tabara, Yoshitaka; Okuno, Itaru; Kaneko, Tadashi; and Watanabe, Tomomi, 4,928,652, Cl. 123-417.000.

Mazilu, Doina: *See*—
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Mc Cann's Engineering and Manufacturing and Co.: *See*—
McCann, Gerald P.; and Holoubek, Andrew J., 4,928,854, Cl. 222-129.100.

McAdory, George D.: *See*—
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McArthur, Alastair; Davis, Royston H.; Hilton, Mark D.; Newton, Trevor W.; and Patel, Dinesh M., to Shell Internationale Research Maatschappij, B. V. Oxadiazole compounds, their preparation and their use as pesticides. 4,929,628, Cl. 514-364.000.

McBeath, Les L.; Sheikholeslami, Amir M.; and Turro, Glenn T., to Zenith Electronics Corporations. Digital color video monitor. 4,929,933, Cl. 340-703.000.

McBeath, Simon C.: *See*—
Langston, Richard D.; Webb, Frances C.; and McBeath, Simon C., 4,928,681, Cl. 128-156.000.

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McCambridge, John M.: *See*—
Luitje, William V.; and McCambridge, John M., 4,930,094, Cl. 364-561.000.

McCandless, Jay H.: *See*—
Voyce, Kenneth G.; and McCandless, Jay H., 4,929,906, Cl. 330-149.000.

McCann, Gerald P.; and Holoubek, Andrew J., to Mc Cann's Engineering and Manufacturing and Co. Superflow diffuser and spout assembly. 4,928,854, Cl. 222-129.100.

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McCarthy, Patrick J., to Atari Games Corporation. Multiple stamp motion objects in a video game system. 4,930,074, Cl. 364-410.000.

McCluskey, Philip H.: *See*—
Hexemer, Richard L., Jr.; Axelson, Scott R.; McCluskey, Philip H.; and Mroz, Thomas J., Jr., 4,929,433, Cl. 423-411.000.

McConnell, Lloyd T., to Adtec Incorporated. Motorized locking mechanism for a door. 4,929,003, Cl. 292-144.000.

McCrackin, Perry J.: *See*—
Schmidt, Donald L.; McCrackin, Perry J.; and Coburn, Charles E., 4,929,666, Cl. 524-516.000.

McCuen, Steven W., to Honeywell Inc. Battery monitor. 4,929,931, Cl. 340-636.000.

McCullough, Francis P., Jr.: *See*—
Cipriano, Robert A.; Snelgrove, R. Vernon; and McCullough, Francis P., Jr., 4,929,521, Cl. 429-102.000.

McDantim, Inc.: *See*—
Fallon, Merton R.; and Clements, Thomas W., 4,928,850, Cl. 222-3.000.

McDevitt, John J., Sr.: *See*—
Kooiman, Cornelis A.; and McDevitt, John J., Sr., 4,929,254, Cl. 48-76.000.

McDonald, Clayton C.: *See*—
Duczkowski, Edward, Jr.; and McDonald, Clayton C., 4,928,602, Cl. 104-111.000.

McFadzen, David B.: *See*—
Redpath, James; Logan, Robert T.; McFadzen, David B.; and Roy, Robert G., 4,929,636, Cl. 514-443.000.

McGaha, George: *See*—
Jones, Arthur L.; and McGaha, George, 4,930,058, Cl. 362-400.000.

McGready, Russell J.: *See*—
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McIntyre, Keith W.; and McIntyre, Scott J., to H. Novis Inc. Automobile windscreen cleaning system. 4,928,580, Cl. 98-2.100.

McIntyre, Scott J.: *See*—
McIntyre, Keith W.; and McIntyre, Scott J., 4,928,580, Cl. 98-2.100.

McKenna, Steve T.: *See*—
Luetkens, Melvin L., Jr.; McKenna, Steve T.; and Melquist, John L., 4,929,763, Cl. 568-402.000.

McKinnon, Donald C., to Ferret. Battery cable clip and cable connection. 4,929,199, Cl. 439-759.000.

McLagan, Angus; Pao, Gei-Jon; Un, Chong S.; and Pearce, John J., Jr., to David Computer Corporation. Automatic data channels for a computer system. 4,930,065, Cl. 364-200.000.

McQueen, Robert W.: *See*—
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Mead Corporation, The: *See*—
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Lee, Chuan; and Kovacs, Kerry, 4,929,531, Cl. 430-138.000.

Meador, Hilman J. Carpet sweeper. 4,929,345, Cl. 209-215.000.

Mecca, Randall S.: *See*—
Utterback, Jeffery J.; and Mecca, Randall S., 4,928,910, Cl. 246-169.00A.

Meckley, John R., to General Electric Company. Systolic radon transform processor. 4,930,076, Cl. 364-413.210.

Medi-Tech International Corporation: *See*—
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Medical College of Ohio: *See*—
Sabin, Jeffrey J., 4,928,958, Cl. 272-96.000.

Medical Engineering Corporation: *See*—
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Medical Laser Uit of Heriot-Watt University of Research Park: *See*—
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Medina, Linda M.: *See*—
Schonauer, Sylvia L.; Medina, Linda M.; and Neel, Donald V., 4,929,461, Cl. 426-438.000.

Medway, David. Hypodermic needle protection device. 4,929,237, Cl. 604-198.000.

Mee, Francis H. A., to Spar Aerospace Limited. Floating Matable element. 4,929,136, Cl. 411-432.000.

Mehne, Georg: *See*—
Schatz, Oskar; Mehne, Georg; and Steidele, Thomas, 4,928,648, Cl. 123-403.000.

Meier, Daniel A.; and Groshans, Michael J., to Nalco Chemical Company. Prevention of vapor phase corrosion caused by halogens in brewery pasteurizers. 4,929,424, Cl. 422-9.000.

Meier, Hans R.; and Evans, Samuel, to Ciba-Geigy Corporation. N-substituted tetrahydroquinolines for use as antioxidants in lubricants. 4,929,732, Cl. 546-158.000.

Meier, Werner; Rambeck, Walter A.; Weiser, Harald; and Zucker, Hermann, to Hoffmann-La Roche Inc. Composition which contain hydroxylated derivatives of vitamin D_3 . 4,929,610, Cl. 514-167.000.

Meiji Seika Kaisha, Ltd.: *See*—
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Shibahara, Seiji; Takahashi, Yukiko; Matsuhashi, Yuji; Hachisu, Mitsugu; Kondo, Shinichi; Takeuchi, Tomio; and Aoyagi, Takaaki, 4,929,633, Cl. 514-423.000.

Meiners, David J.; Morris, Robert A.; Arnold, David; Castonguay, Roger N.; and Palmieri, Joseph M., to General Electric Company. Compact circuit breaker with an electronic trip unit. 4,929,920, Cl. 335-202.000.

Meixner, Ferdinand: *See*—
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Mele, William D. Intravenous boards. 4,928,712, Cl. 128-877.000.

Melquist, John L.: *See*—
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Meltzer, Elliott A.; and Diloia, Albert A., to Thermo-Blade, Inc. Heated windshield wiper blade and holder. 4,928,345, Cl. 15-250.060.

Meltzer, Leonard T.: *See*—
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Melwisch, Harald; and Schneider, Norbert, to U.S Philips Corp. Shaving head for a dry-shaving apparatus. 4,928,389, Cl. 30-43.920.

Memory Technology: *See*—
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Mennicken, Gerhard: *See*—
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Mentzel, Edgar; and Meixner, Ferdinand, to H. F. & Ph. F. Reemtsma GmbH & Co.; and Schoeller & Hoesch GmbH. Cigarette. 4,928,715, Cl. 131-365.000.

Merbler, Rudolph, to Xerox Corporation. Variable speed pulley. 4,929,217, Cl. 474-54.000.

Mercado, Romeo I., to Lockheed Missiles & Space Company, Inc. Long-focus color-corrected petzval-type optical objective. 4,929,071, Cl. 350-463.000.

Mercer, Patricia N.: *See*—
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Mercier, Claude: *See*—
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Merck & Co., Inc.: *See*—
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Hartman, George D.; and Prugh, John D., 4,929,549, Cl. 514-227.800.
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Merit Enterprises, Inc.: *See*—
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Merrell Dow Pharmaceuticals: *See*—
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Merrell Dow Pharmaceuticals Inc.: *See*—
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Merriam, James D.: *See*—
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Merry, Jack D.; and Fink, E. David, to Universal Medical Instrument Corp. Self-sealing percutaneous tube introducer. 4,929,235, Cl. 604-167.000.

Merry, Richard P., to Minnesota Mining and Manufacturing Company. Catalytic converter. 4,929,429, Cl. 422-179.000.

Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung: *See*—
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Metallgesellschaft AG: *See*—
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Metcalf, Darrell J. Quick release latching and dispensing device. 4,929,861, Cl. 312-18.000.

Metzler, Mark W.: *See*—
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Meurer, Kurt P.; Waniczek, Helmut; Sylverter, Gerd; and Witte, Josef, to Bayer Aktiengeselischaft. Polyolefinecarboxylic acids, their preparation and their use for preparing polyolefine-polycarbonate block copolymers. 4,929,689, Cl. 525-333.900.

Meyer, Eric W.; and Van Coney, Robert H., to Procter & Gamble Company, The. Method for blow-molding a container having a neck-portion with internal attachment means. 4,929,410, Cl. 264-533.000.

Meyer, Gundolf; Schonfeld, Erwin; and Verpoort, Clemens, to Asea Brown Boveri AG. Process for producing a multiple-filament oxide superconductor. 4,929,596, Cl. 505-1.000.

Meyer, Howard S.: *See*—
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Meyer, Karl W.: *See*—
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Meyer, Richard S., to Curtice-Burns, Inc. Process for aseptic preparation of particulate food products. 4,929,463, Cl. 426-521.000.

Meyer, Rolf-Volker: *See*—
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Meynier, Patrick, to Institut Fancais du Petrole. Anti-bounce device for preventing the multiple shocks of a moving mass after a first impact against another element. 4,928,784, Cl. 181-106.000.

Miceli, Michael L.: *See*—
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MicroBeam Inc.: *See*—
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Midkiff, David G.; Rippl, Carl G.; Twyman, Nancy D.; and Wahlquist, Joseph D., to Kimberly-Clark Corporation. Absorbent structure for absorbing food product liquids. 4,929,480, Cl. 428-35.600.

Mielsch, Goetz, to Bayerische Motoren Werke AG. Arrangement for producing dispersion layers. 4,929,327, Cl. 204-272.000.

Miettaux, Marc, to Renault Vehicules Industriels. Cylindrical guide device with operating play compensation for fuel injection system. 4,928,887, Cl. 239-584.000.

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Miki, Hideo: *See*—
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Milberger, Lionel J.; Nobileau, Philippe C.; and Watkins, Bruce J., to Vetco Gray Inc. Casing hanger running tool using string weight. 4,928,769, Cl. 166-382.000.

Miles, Thomas O.; and Kreitzer, Carl E., to E-Systems, Inc. Circular waveguide amplitude commutator. 4,929,955, Cl. 342-371.000.

Miller, David J.; Bryant, David R.; Billig, Ernst; and Shaw, Bernard L., to Union Carbide Chemicals and Plastics Company Inc. Treatment of rhodium catalysts. 4,929,767, Cl. 568-454.000.

Miller, David R.: *See*—
Woodworth, Jonathan J.; Johnson, Stephen P.; Miller, David R.; Kester, Jeffrey J.; and Kershaw, Stanley S., Jr., 4,930,039, Cl. 361-127.000.

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Miller, Omer E. Ground simulator. 4,928,966, Cl. 273-195.00A.

Miller, Patrick A., to Bell Communications Research, Inc. Call return telephone service. 4,930,152, Cl. 379-214.000.

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Higgins, Kenneth B.; and Engels, Walter, 4,928,391, Cl. 30-293.000.

Mimoun, Hubert: *See*—
Cameron, Charles; Mimoun, Hubert; Bonnaudet, Serge; and Robine, Alain, 4,929,787, Cl. 585-500.000.

Minagawa, Toshio: *See*—
Itou, Kazumi; Ebe, Kazuyoshi; and Minagawa, Toshio, 4,929,486, Cl. 428-77.000.

Minami, Toshikazu: *See*—
Kurauchi, Makoto; Hashimoto, Michio; Hayasaki, Kiyoshi; Minami, Toshikazu; Ohnishi, Mutsuhiko; and Suzuki, Yohei, 4,929,650, Cl. 523-455.000.

MindCenter Corporation: *See*—
Hardt, James V., 4,928,704, Cl. 128-732.000.
Henderson, Don J.; Brady, Robert; Gamble, Foster R.; Hardt, James V.; Friedfeld, Howard; Salerno, Don; Swanson, Tad; and Sansing, Maureen R., 4,928,696, Cl. 128-644.000.

Mine, Takayuki: *See*—
Inoue, Toshio; Mine, Takayuki; Izutsu, Hitoshi; Yamaguchi, Toshihide; Kobata, Fumihiro; and Kawabata, Juheiji, 4,929,665, Cl. 574-500.000.

Minigrip, Inc.: *See*—
Ausnit, Steven; and Boeckmann, Hugo, 4,929,225, Cl. 493-213.000.
Tilman, Paul A.; Machacek, Zdenek; and Scott, Richmond, 4,929,487, Cl. 428-163.000.

Minnesota Mining & Manufacturing Comp.: *See*—
Rondot, Klaus; and Schlichting, Jorg, 4,928,814, Cl. 206-215.000.

Minnesota Mining and Manufacturing Company: *See*—
Bunker, James E., 4,929,746, Cl. 558-92.000.
Carey, Patrick H., Jr.; and Cowman, Charles D., Jr., 4,929,492, Cl. 428-198.000.

Deziel, Edward W.; Rueb, John T.; Sorlien, Mark D.; Dahlstrom, Jack A.; and Eriemann, David W., 4,929,029, Cl. 303-21.000.
Gerster, John F.; and Knafla, Roy T., 4,929,624, Cl. 514-293.000.
Maxwell, Thomas P., 4,928,694, Cl. 128-637.000.
Merry, Richard P., 4,929,429, Cl. 422-179.000.
Robitaille, James M.; and Wilson, Robert W., 4,929,887, Cl. 324-66.000.
Sowman, Harold G., 4,929,578, Cl. 501-95.000.
Trend, John E., 4,929,392, Cl. 252-582.000.

Mino, Masayuki: *See*—
Kyogoku, Tetsuo; Ishiyama, Masamitsu; and Mino, Masayuki, 4,929,980, Cl. 355-75.000.

Minolta Camera Kabushiki Kaisha: *See*—
Fukui, Kazuyuki, 4,928,951, Cl. 271-113.000.
Kyogoku, Tetsuo; Ishiyama, Masamitsu; and Mino, Masayuki, 4,929,980, Cl. 355-75.000.

Mirenna, Luigi: *See*—
Colle, Roberto; Camaggi, Giovanni; Gozzo, Franco; Ratti, Giuseppina; Garavaglia, Carlo; and Mirenna, Luigi, 4,929,631, Cl. 514-383.000.

Mirowski, Mieczyslaw: *See*—
Mower, Morton M., 4,928,688, Cl. 128-419.0PG.

Mishra, Munmaya K.: *See*—
Kennedy, Joseph P.; and Mishra, Munmaya K., 4,929,683, Cl. 525-268.000.

Misu, Hiroshi: *See*—
Nishikawa, Nobuo; and Misu, Hiroshi, 4,929,533, Cl. 430-169.000.

Mitani, Takahiko: *See*—
Sawai, Kiichi; Kurono, Masayasu; Asai, Hiromiotu; Mitani, Takahiko; Ninomiya, Naohisa; Sugiyama, Takao; Furukawa, Eiji; and Michishita, Hisashi, 4,929,438, Cl. 424-10.000.

Mitchell, Larry L.; and Toney, Crayton G., to Albany International Corp. Flame retardant rolling door. 4,929,497, Cl. 428-265.000.

Mito, Akio: *See*—
Ando, Tsuyoshi; Hirono, Nakayasu; Nakao, Hirotoshi; Mito, Akio; Kihara, Kazuyuki; Hatakenaka, Kosuke; and Ogawa, Hiroshi, 4,928,730, Cl. 137-554.000.

Mito, Kazunori; and Hirata, Masahiro, to Mitsui Petrochemical Industries, Ltd. Electrofusion joint. 4,929,817, Cl. 219-544.000.

Mitoguchi, Fumio: *See*—
Inaba, Yoshiharu; Mitoguchi, Fumio; and Yamashita, Hiromasa, 4,929,165, Cl. 425-150.000.

Mitsubishi Cable Industries, Ltd.: *See*—
Murata, Hiroaki; Inomata, Teruhisa; and Tabira, Masatoshi, 4,929,866, Cl. 313-500.000.

Mitsubishi Denki Kabushiki Kaisha: *See*—
Harara, Mitsuhiko; Takizawa, Shozo; Tanaka, Tadao; and Wada, Shunichi, 4,930,082, Cl. 364-424.050.
Isozumi, Shuzoo, 4,929,857, Cl. 310-83.000.
Kako, Hajime, 4,928,655, Cl. 123-488.000.
Kawase, Hiroyasu, 4,929,810, Cl. 219-69.120.
Kondo, Shigeki, 4,930,079, Cl. 364-424.100.
Konishi, Keiichi, 4,929,858, Cl. 310-83.000.
Kumada, Susumu; Mori, Mikio; Nagatani, Ryoji; and Ano, Tadami, 4,928,502, Cl. 62-440.000.
Ohkubo, Satoru; and Iwata, Toshio, 4,928,653, Cl. 123-435.000.
Omura, Etsuji; and Namizaki, Hirofumi, 4,929,571, Cl. 437-129.000.
Takahira, Kenichi, 4,930,129, Cl. 371-40.400.
Yabu, Atsuhiro; and Tsukahara, Toshiro, 4,930,030, Cl. 360-107.000.
Yamamoto, Yoko; Tanaka, Hitoshi; and Mikami, Noboru, 4,929,081, Cl. 356-354.000.
Yoneda, Masahiro, 4,929,990, Cl. 357-23.600.

Mitsubishi Gas Chemical Company: *See*—
Suzuki, Akinori; Hyeon, Suong B.; Kajita, Toshio; Furushima, Masakazu; Yoshinaka, Shigeo; Suzuki, Takashi; Oda, Mitsunori; and Tanaka, Akinori, 4,929,267, Cl. 71-77.000.

Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See*—
Harara, Mitsuhiko; Takizawa, Shozo; Tanaka, Tadao; and Wada, Shunichi, 4,930,082, Cl. 364-424.050.

Mitsubishi Jukogyo Kabushiki Kaisha: *See*—
Funahashi, Nobuhiro; Yamashita, Toshio; and Ogawa, Hiroshi, 4,928,500, Cl. 62-193.000.
Itahana, Tsutomu; Kanno, Hideo; Ono, Tetsuo; Furuta, Futoru; Kobayashi, Susumu; Akimoto, Ryosaku; and Tanigaki, Ryuhei, 4,928,723, Cl. 137-116.300.
Sato, Hiroshi, 4,929,297, Cl. 156-361.000.
Taguchi, Seizo; Oketani, Toshiharu; Ohashi, Michihiro; Tanaka, Hideaki; and Terao, Hiroshi, 4,929,092, Cl. 374-183.000.

Mitsubishi Kasei Corporation: *See*—
Kuma, Kiyoji, 4,929,756, Cl. 564-267.000.
Yamaguchi, Tatsuaki; and Hirota, Kozo, 4,929,797, Cl. 585-921.000.

Mitsubishi Kinzoku Kabushiki Kaisha: *See*—
Hosono, Katsuaki; and Kushita, Kenji, 4,929,220, Cl. 474-152.000.

Mitsubishi Metal Corporation: *See*—
Takeshita, Takuo; Sugihara, Tadashi; and Fujino, Shuichi, 4,929,597, Cl. 505-1.000.

Mitsubishi Petrochemical Company Limited: *See*—
Takahashi, Kunimasa; Kameda, Takashi; and Shibatani, Haruo, 4,929,404, Cl. 264-29.500.

Mitsubishi Rayon Co.: *See*—
Fujigaki, Takashi; Fujinaga, Yoshikazu; Tokuda, Shuichiro; Furukawa, Noriyuki; Ichimura, Kiyoshi; Shibuya, Yukio; and Iuchi, Shigeru, 4,929,169, Cl. 425-385.000.

Mitsuboshi Belting Ltd.: *See*—
Tanaka, Hiroyuki; Uto, Kuniharu; Kawai, Kazumi; Shaura, Tsuneo; and Yasuhuku, Motonobu, 4,929,221, Cl. 474-205.000.

Mitsui & Co., Ltd.: *See*—
Nakamura, Masanobu, 4,928,509, Cl. 72-61.000.

Mitsui Petrochemical Industries, Ltd.: *See*—
Matsunaga, Fujihisa; and Fukuhara, Hiroshi, 4,929,762, Cl. 568-361.000.
Mito, Kazunori; and Hirata, Masahiro, 4,929,817, Cl. 219-544.000.
Saigo, Akira; Maezawa, Shigenari; Kageyama, Tomoaki; Ishikura, Keizaburo; Sera, Akio; and Suehiro, Junji, 4,929,903, Cl. 324-544.000.

Mitsui Sekiyu Kagaku Kogyo Kabushiki Kaisha: *See*—
Kurauchi, Makoto; Hashimoto, Michio; Hayasaki, Kiyoshi; Minami, Toshikazu; Ohnishi, Mutsuhiko; and Suzuki, Yohei, 4,929,650, Cl. 523-455.000.
Tominaga, Kaoru; and Iwata, Tadao, 4,929,708, Cl. 528-118.000.

Mitsui Toatsu Chemicals, Inc.: *See*—
Nagata, Teruyuki; Okazaki, Koju; Kajimoto, Nobuyuki; Miura, Tohru; Kanemura, Yoshinobu; and Sasagawa, Katsuyoshi, 4,929,707, Cl. 528-76.000.
Narimatsu, Osamu; Ito, Michiyasu; Komatsu, Kazuyoshi; and Shibata, Yasuhiro, 4,928,438, Cl. 51-283.00R.

Mitsuyuki, Yoichiro: *See*—
Yonezawa, Akihiro; Sasaki, Hiroki; Mitsuyuki, Yoichiro; Mori, Yasuki; and Ishigami, Toshihiko, 4,929,869, Cl. 313-639.000.

Miura, Katsuyoshi: *See*—
Yoneda, Akira; and Miura, Katsuyoshi, 4,929,891, Cl. 324-154.0PB.

Miura, Kazutoshi: *See*—
Tanaka, Shigeru; and Miura, Kazutoshi, 4,930,064, Cl. 363-161.000.

Miura, Kunihiko: *See*—
Egawa, Jiro; Tanimoto, Koji; and Miura, Kunihiko, 4,930,087, Cl. 364-518.000.

Miura, Shinji: *See*—
Ohkubo, Yukiharu; Hosoya, Manabu; Miura, Shinji; and Aoki, Yuichi, 4,928,936, Cl. 269-73.000.

Miura, Tohru: *See*—
Nagata, Teruyuki; Okazaki, Koju; Kajimoto, Nobuyuki; Miura, Tohru; Kanemura, Yoshinobu; and Sasagawa, Katsuyoshi, 4,929,707, Cl. 528-76.000.

Miwa, Tetsuji: *See*—
Eda, Kazuo; Miwa, Tetsuji; and Taguchi, Yutaka, 4,930,044, Cl. 361-313.000.

Miyake, Ichiro: *See*—
Nagahara, Shinichi; Suzuki, Tomoyuki; Yamada, Tomoyasu; Takahashi, Tokihiro; and Miyake, Ichiro, 4,930,031, Cl. 360-107.000.

Miyamoto, Mitsuaki: *See*—
Abe, Shinya; Miyamoto, Mitsuaki; Tanaka, Masayuki; Akasaka, Kozo; Hayashi, Kenji; Kawahara, Tetsuya; Katayama, Satoshi; Sakuma, Yoshinori; Suzuki, Takeshi; and Yamatsu, Isao, 4,929,623, Cl. 514-293.000.

Miyamoto, Shigenobu: *See*—
Kimura, Toshio; Okano, Yoshihiro; Otani, Masahiro; and Miyamoto, Shigenobu, 4,930,090, Cl. 364-520.000.

Miyazaki, Koji: *See*—
Daicho, Norio; Kawahara, Masakatsu; Nitta, Jiro; Miyazaki, Koji; and Yonezawa, Keitaro, 4,928,919, Cl. 251-89.000.

Miyazaki, Kunihiro; Ishitobi, Ken; and Yamaguchi, Yosinobu, to Showa Denko Kabushiki Kaisha; and Yamaguchi Seiken Kogyo Kabushiki Kaisha. Abrasive composition and process for polishing. 4,929,257, Cl. 51-309.000.

Miyazaki, Takao, to Fuji Photo Film Co., Ltd. light metering device with detector matrix and mean value detection. 4,929,824, Cl. 364-525.000.

Miyazaki, Toshihiko: *See*—
Sakai, Kunihiro; Miyazaki, Toshihiko; Eguchi, Ken; Kawada, Haruki; Tomida, Yoshinori; Kimura, Toshiaki; Matsuda, Hiroshi; Takimoto, Kiyoshi; and Saito, Kenji, 4,929,524, Cl. 430-56.000.

Miyazawa, Yorikatu: *See*—
Shibazaki, Osamu; Miyazawa, Yorikatu; and Kato, Toshio, 4,928,826, Cl. 206-409.000.

Miyoshi, Takahito; Kanazawa, Minoru; Sugisaki, Tsutomu; Yamada, Takuzi; and Okuzawa, Yasutoshi, to Fuji Photo Film Co., Ltd. Magnetic tape cassette having improved guide pole structure. 4,930,032, Cl. 360-132.000.

Mizuno, Keiichiro; Iida, Kazuyoshi; and Murakami, Kazutomo, to Bridgestone Corporation. Vibration control system. 4,929,874, Cl. 318-128.000.

Mizuno, Masaru: *See*—
Hirayama, Takanobu; Funahashi, Hiroyuki; Yokota, Eiji; Uehara, Mitsuyoshi; Kagami, Isao; Hasegawa, Makoto; and Mizuno, Masaru, 4,929,105, Cl. 400-625.000.

Mizushima, Shoji; and Yamagata, Hideo, to Sankyo Company Limited. DNA containing the prolipoprotein signal peptidase gene. 4,929,559, Cl. 435-252.330.

Mizutani, Minoru; Kikuchi, Hiroshi; Watanabe, Shoichi; Hayashi, Kuniharu; and Maekawa, Masanori, to Oki Electric Co., Ltd. Ribbon protector including electro-conductive elements and platen gap adjustment device incorporating the same. 4,929,102, Cl. 400-248.000.

Mizutani, Yohji: *See*—
Takakusaki, Nobuyuki; Mizutani, Yohji; Kishida, Nobuhiro; and Hosokawa, Manabu, 4,929,450, Cl. 425-526.000.

Mobay Corporation: *See*—
Nodelman, Neil H., 4,929,697, Cl. 528-77.000.

Mobil Oil Corporation: *See*—
Altman, Lawrence J.; Choi, Byung C.; and Karsner, Grant G., 4,929,335, Cl. 208-106.000.
Aufdembrink, Brent A.; and Landis, Michael E., 4,929,587, Cl. 502-242.000.
Bahl, Surinder K.; Canterino, Peter J.; Cunningham, Theresa L.; Evans, Susan P.; and Shaw, Richard G., 4,929,681, Cl. 525-240.000.
Cardis, Angeline B., 4,929,253, Cl. 44-76.000.
Danis, Sara L.; Skaggs, Charles L.; and Thomas, Charles A., 4,928,411, Cl. 40-324.000.
Dessau, Ralph M., 4,929,792, Cl. 585-661.000.
Harandi, Mohsen N.; and Owen, Hartley, 4,929,334, Cl. 208-91.000.
Herbst, Joseph A.; Owen, Hartley; and Schipper, Paul H., 4,929,337, Cl. 208-120.000.
Hoskin, Dennis H., 4,928,766, Cl. 166-270.000.
Kaeding, Warren W.; and Valyocsik, Ernest W., 4,929,790, Cl. 585-651.000.
Kaeding, Warren W., 4,929,791, Cl. 585-651.000.
Morrison, Roger A., 4,929,793, Cl. 585-708.000.
Tsao, Ying-Yen P.; and von Ballmoos, Roland, 4,929,576, Cl. 502-35.000.
Wright, Bernard S.; Gould, Ronald M.; and Owen, Hartley, 4,929,780, Cl. 585-303.000.

Mochida, Kenichi: *See*—
Eguchi, Tamotsu; Oshiro, Takashi; Kuge, Yukihiro; Mochida, Kenichi; and Uwajima, Takayuki, 4,929,551, Cl. 435-106.000.

Mochizuki, Mitsuhiro: *See*—
Sugiyama, Noriyuki; and Mochizuki, Mitsuhiro, 4,929,712, Cl. 528-230.000.

Moellers, Gerd: *See*—
Pleschiutschnigg, Fritz-Peter; Moellers, Gerd; Eberhardt, Hans-Georg; Rahmfeld, Werner; Parschat, Lothar; and Ehrenberg, Hans-Juergen, 4,928,747, Cl. 164-418.000.

Mohajer, Yousef; and Lazarus, Stanley D., to Allied-Signal Inc. Reduction of carboxyl end groups in polyester with dilactim ethers. 4,929,715, Cl. 528-272.000.

Mohr, Dieter: *See*—
Stephani, Trutz-Ulrich; Mohr, Dieter; Maisel, Britta; and Frass, Werner, 4,929,534, Cl. 430-191.000.

Mohrs, Klaus; Raddatz, Siegfried; Fruchtmann, Romanis; Kohlsdorfer, Christian; and Muller-Peddinghaus, Reiner, to Bayer Aktiengesellschaft. α-substituted 4-(quinolin-2-yl-methoxy)phenylacetic acids and esters and lipoxygenase inhibition therewith. 4,929,626, Cl. 514-311.000.

Mokrosz, Maria: *See*—
Strekowski, Lucjan; Mokrosz, Maria; and Harden, Donald B., 4,929,726, Cl. 544-122.000.

Molex Incorporated: *See*—
Ponn, Timothy R.; Gutierrez, Mark; and Gugelmeyer, Robert J., 4,929,196, Cl. 439-620.000.

Molins PLC: *See*—
Arthur, Hugh M., 4,928,713, Cl. 131-84.100.

Moll, Norman G.; and Johnson, David R., to Dow Chemical Company, The. Expandable and expanded plastic materials and methods for casting metal castings employing such expanded cellular plastic materials. 4,929,645, Cl. 521-98.000.

Moller, Ulrich: *See*—
Steinkuhle, Ferdinand; Strate, Klaus; Durkop, Willi; and Moller, Ulrich, 4,929,186, Cl. 439-78.000.

Molloy, John F. Ceiling panel installation support with telescoping panel rest for ease of carrying. 4,928,916, Cl. 248-354.100.

Moltner, Hermann: *See*—
Staat, Karlhans; and Moltner, Hermann, 4,928,507, Cl. 72-38.000.

Mondelo, Fernando C.; and Ferrero, Maria T. M., to Covex, S.A. Process for the preparation of (−) eburnamenin-14-(15H)-one resinates. 4,929,440, Cl. 424-79.000.

Monett, Michael R., to Memory Technology. Method and apparatus for increasing throughput on disk drive quality control testing. 4,929,894, Cl. 324-212.000.

Montfort, Benoit, to Salomon S. A. Slide device for adjusting the relative elements of a ski boot. 4,928,406, Cl. 36-117.000.

Moore, Arnold L. Handicap bathtub lift. 4,928,330, Cl. 4-562.000.

Moore, George G. I.; and Hansen, John C. Perfluoroaminoethers. 4,929,725, Cl. 544-87.000.

Moore, James E.: *See*—
Kerr, Stuart R., III; and Moore, James E., 4,929,506, Cl. 428-412.000.

Moore, Kent R.: *See*—
Lanier, Joel P.; Hall, Tamuel A.; and Moore, Kent R., 4,928,957, Cl. 272-72.000.

Moorman, Charles T.; Sabadics, Joseph L.; and Bruscino, Joseph A., to Kraft General Foods, Inc. Method and apparatus for continuous contact of supercritical fluid with particulate solids. 4,929,462, Cl. 426-478.000.

Moos, Walter H.: *See*—
Coughenour, Linda L.; Davis, Robert E.; Downs, David A.; Heffner, Thomas G.; Meltzer, Leonard T.; Moos, Walter H.; Moreland, David W.; and Tecle, Haile, 4,929,734, Cl. 546-338.000.

Moreland, David W.: *See*—
Coughenour, Linda L.; Davis, Robert E.; Downs, David A.; Heffner, Thomas G.; Meltzer, Leonard T.; Moos, Walter H.; Moreland, David W.; and Tecle, Haile, 4,929,734, Cl. 546-338.000.

Moreno, Frederick E.: *See*—
Joshi, Narendra D.; and Moreno, Frederick E., 4,928,481, Cl. 60-737.000.

Moreschini, Ronald. Stay full-easy load "turbo" prophylactic polishing cup. 4,929,180, Cl. 433-166.000.

Morgan, James C. Multiple axis hidden hinge. 4,928,350, Cl. 16-297.000.

Morgan, Norman C.: *See*—
Pasek, Eugene A.; and Morgan, Norman C., 4,929,583, Cl. 502-64.000.

Morgan, Richard H. Flexible foam pictures. 4,929,213, Cl. 446-97.000.

Morgan, Robert D. Bicycle rack for carrying sport boards. 4,928,863, Cl. 224-39.000.

Mori, Hiroshi: *See*—
Abe, Fumio; Mori, Hiroshi; and Takagi, Shigekazu, 4,929,406, Cl. 264-45.500.

Mori, Kei; Akaishi, Hakaru; Kakihara, Kenji; and Kitayama, Yoshiro, to Mori, Kei. Container for accommodating a solar ray-collecting device. 4,928,666, Cl. 126-440.000.

Mori, Mikio: *See*—
Kumada, Susumu; Mori, Mikio; Nagatani, Ryoji; and Ano, Tadami, 4,928,502, Cl. 62-440.000.

Mori, Seiichi: *See*—
Ainoya, Masayuki; Ishihara, Takeyuki; Kanno, Tesuo; Kikuchi, Takahiro; Mori, Seiichi; Nobumori, Shogo; and Shirakawa, Junji, 4,929,982, Cl. 355-311.000.

Mori, Shigeki: *See*—
Otoshima, Hiroo; Tsuji, Hiroshi; Mori, Shigeki; and Nishimura, Yoshihiro, 4,928,476, Cl. 57-268.000.

Mori, Yasuki: *See*—
Yonezawa, Akihiro; Sasaki, Hiroki; Mitsuyuki, Yoichiro; Mori, Yasuki; and Ishigami, Toshihiko, 4,929,869, Cl. 313-639.000.

Mori, Yasuo: *See*—
Sugi, Tokio; Mori, Yasuo; and Takahashi, Yugi, 4,928,524, Cl. 73-200.000.

Morigaki, Masakazu; and Aoki, Kozo, to Fuji Photo Film Co., Ltd. Silver halide color photographic material. 4,929,538, Cl. 430-551.000.

Morinaga, Shigeki; and Watabe, Mitsuru. Programmable pulse input-/output processing unit having register types specified by instructions. 4,930,100, Cl. 364-900.000.

Morita, Isao, to Kabushiki Kaisha Toshiba. Magnetic disk apparatus. 4,930,029, Cl. 360-97.010.

Morita, Yasuhiko; Kakiguchi, Yoshitomi; and Izuhara, Seiji, to Takeda Chemical Industries, Ltd. Bath preparation. 4,929,378, Cl. 252-105.000.

Moritani, Tohei; Oda, Hidemasa; Sato, Toshiaki; Negi, Taichi; Matsumura, Keiji; Kawai, Syuji; Tanaka, Nobuo; and Hirofuji, Satoshi, to Kuraray Co., Ltd. Heat resistant container. 4,929,482, Cl. 428-36.400.

Moriya, Yutaka; Sanpei, Tetsuya; and Tagawa, Hisatoshi, to NKK Corporation. Iron-based shape-memory alloy excellent in shape-memory property and corrosion resistance. 4,929,289, Cl. 148-402.000.

Moriyama, Kenzo: *See*—
Suzuki, Shuuji; Moriyama, Kenzo; and Sueoka, Yuuji, 4,930,128, Cl. 371-12.000.

Morrell, Mark L.: *See*—
Carpenter, Larry L.; Hagerty, Robert J.; Maschmeyer, Richard O.; Morrell, Mark L.; and Schrauth, Peter A., 4,929,265, Cl. 65-64.000.

Morris, Brian G., to Eastman Kodak Company. Ink supply construction and printing method for drop-on-demand ink jet printing. 4,929,969, Cl. 346-140.00R.

Morris, Lamont C.; Kuna, Wayne A.; and Terzian, Rouben T., to Marvin Glass & Associates. Rotating ring and character toy. 4,929,216, Cl. 446-324.000.

Morris, Robert A.: *See*—
Meiners, David J.; Morris, Robert A.; Arnold, David; Castonguay, Roger N.; and Palmieri, Joseph M., 4,929,920, Cl. 335-202.000.

Morrison, Elbert F., to Burlington Industries, Inc. Yarn produced by spinning with vacuum. 4,928,464, Cl. 57-224.000.

Morrison, Roger A., to Mobil Oil Corporation. Production of middle distillates by paraffin disproportionation. 4,929,793, Cl. 585-708.000.

Morton, William D., Jr., to Precision Monolithics, Inc. Positive retention chip carrier. 4,928,934, Cl. 206-328.000.

Moser, Hans; Pissiotas, Georg; Brunner, Hans-Georg; Bohner, Beat; and Baumann, Marcus, to Ciba-Geigy Corporation. N-phenyl-maleimides and N-phenyl-succinimides and their use in a herbicidal and/or plant growth regulating action. 4,929,272, Cl. 71-95.000.

Moser, Mark D.; Lawson, R. Joe; Antos, George J.; Wang, Li; and Parulekar, Vivekanand N., to UOP. Multizone catalytic reforming process. 4,929,332, Cl. 208-65.000.

Moser, Mark D.; Lawson, R. Joe; Wang, Li; and Parulekar, Vivekanand N., to UOP. Multizone catalytic reforming process. 4,929,333, Cl. 208-65.000.

Moses, Cornellius, Jr.: *See*—
Walton, Paul B.; Keough, James; Demers, Richard L.; Denny, Leland A., Jr.; Kaiser, Robert E.; Moses, Cornellius, Jr.; and Wagh, Vijay N., 4,930,151, Cl. 379-94.000.

Moshier, Mark; and Politte, Ron, to Continental Baking Company. Dual injection cake filler apparatus. 4,928,592, Cl. 99-450.800.

Motomura, Noriyuki, to Toshiba Kikai Kabushiki Kaisha. Electromagnetic molten metal supply system. 4,928,933, Cl. 266-237.000.

Motorenfabrik Hatz GmbH & Co. KG: *See*—
Kampichler, Guenter; and Eder, Erich, 4,928,643, Cl. 123-185.00B.

Motorola Inc.: *See*—
Glover, Douglas L., 4,928,587, Cl. 101-42.000.

Guzik, Andrzej T.; Curtis, James H.; Habbabu, Faris S.; and Shah, Kirit, 4,929,062, Cl. 350-345.000.
Kazecki, Henry L.; and Baker, James C., 4,930,126, Cl. 370-109.000.
Pace, Gary L., 4,929,851, Cl. 307-359.000.
Pace, Gary L.; and Overton, David H., 4,929,910, Cl. 330-257.000.
Parrillo, Louis C., 4,929,565, Cl. 437-34.000.
Poglitsch, Lawrence R., 4,928,376, Cl. 29-530.000.

Mottate, Tatsuo, to Nippon Thompson Co., Ltd. Thin-walled reciprocating rectilinear motion rolling guide unit equipped with stress-resisting ball retainer. 4,929,097, Cl. 384-49.000.

Moulin, Pierre: *See*—
Gonon, Jean-Louis; and Moulin, Pierre, 4,929,190, Cl. 439-409.000.

Movick, Nyle O. Apparatus for determining the center of gravity of a spherical ball. 4,928,516, Cl. 73-65.000.

Mower, Morton M., to Mirowski, Mieczyslaw. Method and apparatus for treating hemodynamic disfunction. 4,928,688, Cl. 128-419.0PG.

Moyer, Roy E.: *See*—
Oliver, Wayne R.; Moyer, Roy E.; and Girardin, Dennis R., 4,928,480, Cl. 60-39.092.

Mross, Wolf D.: *See*—
Taglieber, Volker; Hoelderich, Wolfgang; Kummer, Rudolf; Mross, Wolf D.; and Saladin, Guenter, 4,929,758, Cl. 564-485.000.
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Mroz, Thomas J., Jr.: *See*—
Hexemer, Richard L., Jr.; Axelson, Scott R.; McCluskey, Philip H.; and Mroz, Thomas J., Jr., 4,929,433, Cl. 423-411.000.

MTM Obermaier GmbH & Co. KG: *See*—
Magin, Berthold, 4,928,338, Cl. 8-149.100.

MTU Motoren-und Turbinen-Union Munchen: *See*—
Wildner, Walter, 4,929,154, Cl. 416-230.000.

Muhr und Bender Maschinenbau GmbH: *See*—
Schulte, Karl-Heinz, 4,928,377, Cl. 29-560.000.

Muhrer, Gerhard; Pannold, Reinhard; and Boschanig, Reinhard, to AVL Gesellschaft fur Verbrennungskraftmaschinen und Messtechnik m.b.H. Prof. Dr.Dr.h.c. Hans List. Method and apparatus for identifying ballistic characteristics within a weapon barrel. 4,928,523, Cl. 73-167.000.

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Henze, Christopher P.; and Mulkern, Joseph H., 4,930,063, Cl. 363-91.000.

Mullen, Walter T., to Air Products and Chemicals, Inc. Combustion of low B.T.U./high moisture content fuels. 4,928,606, Cl. 110-347.000.

Mullendore, Arthur W., to United States of America, Energy. Formation of amorphous metal alloys by chemical vapor deposition. 4,929,468, Cl. 427-47.000.

Muller, Erich: *See*—
Nickl, Josef; Heckel, Armin; Muller, Erich; Narr, Berthold; Weisenberger, Johannes; Eisert, Wolfgang; and Muller, Thomas, 4,929,754, Cl. 562-428.000.

Muller, Hanns P.: *See*—
Mazanek, Jan; von Gizycki, Ulrich; Muller, Hanns P.; Wienkenhover, Martin; Wieser, Karl-Heinz; Paulat, Volker; Theuer, Werner; and Muller, Walter, 4,929,705, Cl. 528-49.000.

Muller, Johann: *See*—
Burger, Christa; Muller, Johann; and Bosch, Erhard, 4,929,647, Cl. 522-99.000.

Muller-Peddinghaus, Reiner: *See*—
Mohrs, Klaus; Raddatz, Siegfried; Fruchtmann, Romanis; Kohlsdorfer, Christian; and Muller-Peddinghaus, Reiner, 4,929,626, Cl. 514-311.000.

Muller-Stute, Friedrich; and Weil, Gunter, to U.S. Philips Corporation. Display unit and optical waveguide for use in same. 4,929,053, Cl. 350-96.340.

Muller, Thomas: *See*—
Nickl, Josef; Heckel, Armin; Muller, Erich; Narr, Berthold; Weisenberger, Johannes; Eisert, Wolfgang; and Muller, Thomas, 4,929,754, Cl. 562-428.000.

Muller, Walter: *See*—
Mazanek, Jan; von Gizycki, Ulrich; Muller, Hanns P.; Wienkenhover, Martin; Wieser, Karl-Heinz; Paulat, Volker; Theuer, Werner; and Muller, Walter, 4,929,705, Cl. 528-49.000.

Mullins, Edward T.: *See*—
Lentz, Carl M.; Mullins, Edward T.; and Gibson, Charles L., 4,929,737, Cl. 548-365.000.

Munford, Robert S.; and Hall, Catherine L., to Board of Regents, The University of Texas System. Lipopolysaccharides of reduced toxicity and the production thereof. 4,929,604, Cl. 514-53.000.

Murai, Shigeo: *See*—
Haga, Takahiro; Tsujii, Yasuhiro; Isogai, Tatsuo; Murai, Shigeo; and Tanaka, Toshihiro, 4,929,729, Cl. 544-330.000.

Murakami, Eiichi: *See*—
Sato, Mitsuya; Ukaji, Takao; Yamaguchi, Nobuhito; Ohmori, Taro; and Murakami, Eiichi, 4,929,893, Cl. 324-158.00F.

Murakami, Kazutomo: *See*—
Mizuno, Keiichiro; Iida, Kazuyoshi; and Murakami, Kazutomo, 4,929,874, Cl. 318-128.000.

Murakami, Koichi: *See*—
Uto, Nobutaka; Shido, Hironori; Saito, Jun; Hiroi, Masakazu; Kobayashi, Kenji; Murakami, Koichi; and Naito, Masataka, 4,928,941, Cl. 270-53.000.

Murakami, Kunio: *See*—
Okada, Takuji; and Murakami, Kunio, 4,929,501, Cl. 428-337.000.

Muraoka, Kiyoshige: *See*—
Nishimura, Yoshifumi; Yamamoto, Susumu; Nakata, Hidekazu; Muraoka, Kiyoshige; Uchida, Mamoru; and Taguchi, Takafumi, 4,929,512, Cl. 428-610.000.

Murata, Hiroaki; Inomata, Teruhisa; and Tabira, Masatoshi, to Mitsubishi Cable Industries, Ltd. Light emitting diode lamp. 4,929,866, Cl. 313-500.000.

Murata, Hiroyoshi: *See*—
Matsumoto, Osamu; Maruyama, Tadashi; Murata, Hiroyoshi; Abe, Isao; Shigematsu, Tomohisa; Shinada, Kazuyoshi; Suzuki, Yasoji; and Kobayashi, Ichiro, 4,930,105, Cl. 365-185.000.

Murata Kikai Kabushiki Kaisha: *See*—
Matsui, Isamu; Uehara, Masao; Noshi, Shinji; and Kawarabashi, Tsukasa, 4,928,475, Cl. 57-264.000.
Otoshima, Hiroo; Tsuji, Hiroshi; Mori, Shigeki; and Nishimura, Yoshihiro, 4,928,476, Cl. 57-268.000.

Murata Manufacturing Co., Ltd.: *See*—
Kohno, Yoshiaki; and Sakai, Norio, 4,929,295, Cl. 156-230.000.

Murata, Masashi: *See*—
Akanuma, Hideo; Murata, Masashi; Inoue, Kiyoshi; and Ohgake, Ryoji, 4,929,372, Cl. 252-29.000.

Murata Wiedemann, Inc.: *See*—
Chun, Victor L.; Hunter, James R.; and Jaworski, George, 4,929,276, Cl. 83-552.000.

Murata, Yasuo: *See*—
Nishimura, Masakatsu; Okada, Naoya; Murata, Yasuo; and Hirai, Yasuhiko, 4,929,317, Cl. 204-59.00R.

Murata, Yoshiyuki; and Manabe, Hajime, to Casio Computer Co., Ltd. Electronic tuning apparatus for an electronic stringed musical instrument. 4,928,563, Cl. 84-726.000.

Murayama, Jin; Kudoh, Yoshimitsu; and Kondo, Ryuji, to Fuji Photo Film Co., Ltd. Color solid state image pickup element with plural photocells of a same color within a subunit thereof controlled by a common control line and outputting to a common signal line. 4,930,006, Cl. 358-44.000.

Muro, Atsushi: *See*—
Egashira, Noritaka; Suto, Kenichiro; and Muro, Atsushi, 4,929,591, Cl. 503-227.000.

Muroya, Fumio; and Kotani, Yoshiaki, to Honda Giken Kabushiki Kaisha. Engine control device for mower. 4,928,458, Cl. 56-11.800.

Murphy, Robert H.; and Gosselin, Roland, to R. H. Murphy Company, Inc. Snap on bumper for electronic packages. 4,928,820, Cl. 206-328.000.

Murray, Douglas J., to Baker Hughes Incorporated. Mechanical manipulation tool with hydraulic hammer. 4,928,770, Cl. 166-385.000.

Murray, James S.: *See*—
Clark, John; Martel, Brian J.; and Murray, James S., 4,929,877, Cl. 318-560.000.

Murray, Malcolm G., Jr. Shaft alignment system. 4,928,401, Cl. 33-645.000.

Murrin, John A., Jr. Paint can construction. 4,928,846, Cl. 220-354.000.

Murugesan, Natesan: *See*—
Wasserman, Harry H.; Murugesan, Natesan; and Van Duzer, John H., 4,929,751, Cl. 560-174.000.

Musser, James A.: *See*—
Bremner, Douglas L.; Crews, Gary A.; and Musser, James A., 4,930,110, Cl. 367-56.000.

Mustain, Lewis B.: *See*—
Dieterlen, Paul E.; and Mustain, Lewis B., 4,930,147, Cl. 378-176.000.

Muszik, Janos: *See*—
Bachem, Henning; Suling, Carlhans; Muszik, Janos; and Schroer, Wolf-Dieter, 4,929,309, Cl. 162-164.300.

Muszynski, Larry C., to Lone Star Industries, Inc. Pipeline casing insulator. 4,928,736, Cl. 138-178.000.

Muto, Shunichi; Inata, Tsuguo; Takeuchi, Atsushi; and Sugiyama, Yoshihiro, to Fujitsu Limited. Resonant tunnelling barrier structure device. 4,929,984, Cl. 357-4.000.

Myakishev, Anatoly K.: *See*—
Tikhonovich, Vadim I.; Pavljuk, Vladimir D.; Vinokur, Bertold B.; Kondratjuk, Stanislav E.; Lutsenko, Georgy G.; Edemsky, Vladimir K.; Kiselev, Vladimir B.; Karasev, Nikolai M.; and Myakishev, Anatoly K., 4,929,416, Cl. 420-12.000.

Myers, Garry L.: *See*—
Wang, Richard H. S.; and Myers, Garry L., 4,929,654, Cl. 524-117.000.

Naaktgeboren, Adrianus: *See*—
Lippens, Christiaan A. C.; and Naaktgeboren, Adrianus, 4,928,462, Cl. 56-341.000.

Nafziger, Richard D.: *See*—
Bauer, Thomas M.; Dunn, Thomas A.; Gurke, Christina M.; Hopkins, John W.; and Nafziger, Richard D., 4,930,154, Cl. 379-246.000.

Nagahara, Shinichi; Suzuki, Tomoyuki; Yamada, Tomoyasu; Takahashi, Tokihiro; and Miyake, Ichiro, to Pioneer Electronic Corporation. Apparatus for recording and reproducing digital signals using a helical scan. 4,930,031, Cl. 360-107.000.

Nagano, Masashi, to Shimano Industrial Company Limited. Pedal for a bicycle. 4,928,549, Cl. 74-594.600.

Nagao, Takeyoshi; and Kohashi, Toru, to Yamato Scale Company, Limited. Device for automatically filling and packing predetermined weight of product in containers. 4,928,473, Cl. 53-53.000.
Nagarai, D. R.: *See*—
Wang, Samuel S.; and Nagarai, D. R., 4,929,343, Cl. 209-166.000.
Nagasawa, Shinji, to NOK Corporation. Sealing apparatus. 4,928,979, Cl. 277-38.000.
Nagata, Teruyuki; Okazaki, Koju; Kajimoto, Nobuyuki; Miura, Tohru; Kanemura, Yoshinobu; and Sasagawa, Katsuyoshi, to Mitsui Toatsu Chemicals, Inc. Polyurethane base lens resin, plastic lens comprising the resin and preparation method of the lens. 4,929,707, Cl. 528-76.000.
Nagatani, Ryoji: *See*—
Kumada, Susumu; Mori, Mikio; Nagatani, Ryoji; and Ano, Tadami, 4,928,502, Cl. 62-440.000.
Nagatori, Wesley S. Arrowhead. 4,928,969, Cl. 273-422.000.
Nagatsuka, Ikutaroh: *See*—
Shinoki, Masayoshi; Takagi, Masahiro; Nagatsuka, Ikutaroh; Kumashiro, Koichi; Aoki, Takayoshi; and Takeda, Masayuki, 4,929,528, Cl. 430-108.000.
Nahara, Akira: *See*—
Yamada, Takashi; Nomura, Masaaki; Yamamoto, Ryoichi; Matsubaguchi, Satoshi; and Nahara, Akira, 4,929,320, Cl. 204-192.200.
Naito, Masataka: *See*—
Uto, Nobutaka; Shido, Hironori; Saito, Jun; Hiroi, Masakazu; Kobayashi, Kenji; Murakami, Koichi; and Naito, Masataka, 4,928,941, Cl. 270-53.000.
Naito, Ryuichi: *See*—
Yokogawa, Fumihiko; and Naito, Ryuichi, 4,929,917, Cl. 331-1.00A.
Naito, Toshihiko: *See*—
Machida, Yoshimasa; Negi, Shigeto; Kamiya, Takashi; Komatu, Yuuki; Sugiyama, Isao; Kai, Yasunobu; Nakamura, Takaharu; Naito, Toshihiko; Kitoh, Kyosuke; Katsu, Kanemasa; and Yamauchi, Hiroshi, 4,929,612, Cl. 514-202.000.
Naitoh, Takao; and Nakayama, Seidai, to Fuji Jukogyo Kabushiki Kaisha. System for cooling an internal combustion engine including a turbocharger. 4,928,637, Cl. 123-41.310.
Naka, Motohiko: *See*—
Kanamori, Katsuhiro; Kanno, Yoshimitsu; Kurosawa, Toshiharu; Kawakami, Hidehiko; Naka, Motohiko; and Kotera, Hiroaki, 4,929,978, Cl. 355-38.000.
Nakabayashi, Shigetoshi: *See*—
Otomura, Keiichiro; Yamashita, Takayuki; Kanemitsu, Setsuo; Nakabayashi, Shigetoshi; and Miki, Hideo, 4,929,430, Cl. 423-11.000.
Nakagawa, Norio; Takagi, Katsuaki; and Aoki, Hirokazu, to Hitachi, Ltd. Content-addressed memory. 4,930,104, Cl. 365-49.000.
Nakagawa, Sumio; Toiyama, Masaoki; Uno, Yoshinobu; and Kohda, Hiromichi, to Nippon Gohsei Kagaku Kogyo Kabushiki Kainha. Process for preparing dialdehyde. 4,929,768, Cl. 568-473.000.
Nakai, Sadao: *See*—
Yamazoe, Seigo; Nakai, Sadao; and Fukui, Yukimasa, 4,929,847, Cl. 250-573.000.
Nakajima, Akira, to NEC Corporation. Key input apparatus. 4,929,944, Cl. 341-24.000.
Nakajima, Shigeo: *See*—
Yoshida, Masaru; Yoshikawa, Mitsuhiko; Yoshimoto, Yoshikazu; Wada, Hiroshi; Suzuki, Tomonari; and Nakajima, Shigeo, 4,929,803, Cl. 174-117.00M.
Nakaminami, Masamitsu: *See*—
Yaguchi, Yoshinori; Kubota, Masahiro; and Nakaminami, Masamitsu, 4,928,381, Cl. 29-568.000.
Nakamoto, Tetsuo: *See*—
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Nakamura, Atsushi: *See*—
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Nakamura, Haruo: *See*—
Aoki, Kenji; Takei, Katsumori; Nakamura, Haruo; and Matsushita, Yoshikazu, 4,929,057, Cl. 350-333.000.
Nakamura, Keizi, to Roman Shoji Co., Ltd. Plastic heels of shoes and boots. 4,928,403, Cl. 36-34.00A.
Nakamura, Kikuo, to Sigma Incorporated. Reel driving device for use in the slot machine. 4,928,964, Cl. 273-143.00R.
Nakamura, Masanobu, to Mitsui & Co., Ltd.; and Kokan Kako Co., Ltd. Method for manufacturing a pipe with projections. 4,928,509, Cl. 72-61.000.
Nakamura, Michiya, to NEC Corporation. Microcomputer having a high-speed operation mode and a low-speed operation mode with intermittent disabling of sense amplifiers. 4,930,067, Cl. 364-200.000.
Nakamura, Mitsuhiro: *See*—
Kawai, Nobuyuki; and Nakamura, Mitsuhiro, 4,929,804, Cl. 200-5.00A.
Nakamura, Nobuaki; Hirose, Yukimi; Kai, Masakatsu; and Itonaga, Makoto, to Victor Company of Japan, Ltd. Detection system with an optical encoder to optically detect displacement amount of a movable device. 4,929,822, Cl. 250-201.400.
Nakamura, Takaharu: *See*—
Machida, Yoshimasa; Negi, Shigeto; Kamiya, Takashi; Komatu, Yuuki; Sugiyama, Isao; Kai, Yasunobu; Nakamura, Takaharu; Naito, Toshihiko; Kitoh, Kyosuke; Katsu, Kanemasa; and Yamauchi, Hiroshi, 4,929,612, Cl. 514-202.000.
Nakamura, Yoshinobu: *See*—
Hamada, Akihiko; Hiraoka, Hidenori; Nakamura, Yoshinobu; and Ohtsuru, Hiroshi, 4,929,678, Cl. 525-193.000.
Nakanishi, Tatsuo; Tadokoro, Toyohiko; and Fujimura, Masaki, to Yamaha Corporation. Iron club head for golf. 4,928,972, Cl. 273-78.000.
Nakano, Masaki, to Nissan Motor Co., Ltd. Continuously variable traction roller transmission. 4,928,542, Cl. 74-200.000.
Nakano, Ryo: *See*—
Yamada, Hiroshi; Nakano, Ryo; Matsuo, Yasutoshi; and Mikami, Seiichi, 4,930,005, Cl. 358-36.000.
Nakao, Haruki, to Nikki Co., Ltd. Nozzle device. 4,928,885, Cl. 239-417.000.
Nakao, Hirotoshi: *See*—
Ando, Tsuyoshi; Hirono, Nakayasu; Nakao, Hirotoshi; Mito, Akio; Kihara, Kazuyuki; Hatakenaka, Kosuke; and Ogawa, Hiroshi, 4,928,730, Cl. 137-554.000.
Nakase, Kazuhiko, to Harada Kogyo Kabushiki Kaisha. Non-grounded type ultrahigh frequency antenna. 4,929,961, Cl. 343-715.000.
Nakata, Hidekazu: *See*—
Nishimura, Yoshifumi; Yamamoto, Susumu; Nakata, Hidekazu; Muraoka, Kiyoshige; Uchida, Mamoru; and Taguchi, Takafumi, 4,929,512, Cl. 428-610.000.
Nakatani, Kouichiro, to Velbon International Corporation. Panhead with quick release shoe. 4,929,973, Cl. 354-293.000.
Nakayama, Mitsuyuki: *See*—
Inukai, Yuzo; and Nakayama, Mitsuyuki, 4,928,719, Cl. 137-1.000.
Nakayama, Seidai: *See*—
Naitoh, Takao; and Nakayama, Seidai, 4,928,637, Cl. 123-41.310.
Nakayama, Takahide, to Hirata Industrial Machineries Co., Ltd. Intelligent pallet. 4,929,827, Cl. 250-223.00R.
Nalco Chemical Company: *See*—
Hoots, John E.; Johnson, Donald A.; Fong, Dodd W.; and Kneller, James F., 4,929,425, Cl. 422-13.000.
Meier, Daniel A.; and Groshans, Michael J., 4,929,424, Cl. 422-9.000.
Reardon, Patricia A.; and Grattan, David A., 4,929,364, Cl. 210-750.000.
Stenger, Claudia V.; and Huang, Shu-Jen W., 4,929,382, Cl. 252-181.000.
Namba, Mitsuo; and Uematsu, Reppei, to Matsushita Electric Industrial Co., Ltd.; and High Pressure Gas Safety Institute of Japan, The. Gas shutoff apparatus. 4,928,728, Cl. 137-486.000.
Namizaki, Hirofumi: *See*—
Omura, Etsuji; and Namizaki, Hirofumi, 4,929,571, Cl. 437-129.000.
Naoi, Hidenori: *See*—
Hatakeyama, Motonobu; Yoshimura, Kohtaroh; Naoi, Hidenori; and Wakasugi, Nobuo, 4,930,089, Cl. 361-519.000.
Naoumidis, Aristides: *See*—
Gat-Liquornik, Martin; and Naoumidis, Aristides, 4,928,870, Cl. 228-107.000.
Narasimhan, M. Jeersannidhi, Jr.: *See*—
Thirumalachar, M. Jeersannidhi; and Narasimhan, M. Jeersannidhi, Jr., 4,929,341, Cl. 208-390.000.
Narimatsu, Osamu; Ito, Michiyasu; Komatsu, Kazuyoshi; and Shibata, Yasuhiro, to Mitsui Toatsu Chemicals, Incorporated. Wafer processing film. 4,928,438, Cl. 51-283.00R.
Narr, Berthold: *See*—
Nickl, Josef; Heckel, Armin; Muller, Erich; Narr, Berthold; Weisenberger, Johannes; Eisert, Wolfgang; and Muller, Thomas, 4,929,754, Cl. 562-428.000.
Narula, Dipak B.; Be, Anh; and Swihart, Terence J., to Dow Corning Corporation. Solventless silicone coating composition. 4,929,703, Cl. 528-23.000.
Narushima, Teruo: *See*—
Kanda, Shuhei; Hirota, Mitugu; and Narushima, Teruo, 4,930,024, Cl. 360-10.100.
Naser, Georg: *See*—
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Reichenberger, Helmut; and Naser, Georg, 4,928,671, Cl. 128-24.00A.
Natarajan, Bangalore R.; and Walmsley, Robert G., to Hewlett-Packard Company. Thin film media for high density longitudinal magnetic recording. 4,929,514, Cl. 428-611.000.
Nath, Narendra: *See*—
Nevin, Ira; and Nath, Narendra, 4,928,663, Cl. 126-21.00A.
Nathan, Efraim, to Lontex Corporation. Garments and parts thereof. 4,928,323, Cl. 2-406.000.
National Research Counsil of Canada/Conseil National de Recherches du Canada: *See*—
Vandersluis, Ron; and Quittner, Erik, 4,929,011, Cl. 294-86.400.
National Research Development Corporation, The: *See*—
Cook, Peter, 4,929,420, Cl. 420-466.000.
National Science Council: *See*—
Chern, Ji-Wang; Liu, Kang-Chien; and Chen, Chia-Yin, 4,929,728, Cl. 544-284.000.
National Semiconductor Corporation: *See*—
Howell, Paul J., 4,929,570, Cl. 437-89.000.
Szepesi, Tamas S., 4,929,882, Cl. 323-222.000.
National Starch and Chemical Investment Holding Corporation: *See*—
Billmers, Robert L.; Del Giudice, David M.; Tessler, Martin M.; and Hasuly, Michael J., 4,929,670, Cl. 525-54.100.
Nautical Development, Inc.: *See*—
Speer, Stephen R., 4,929,153, Cl. 416-46.000.

NCR Corporation: *See*—
Collins, Donald A., Jr., 4,929,819, Cl. 235-383.000.
Houser, James S.; and Finfrock, Don C., 4,930,093, Cl. 364-551.010.
NDC Company, Ltd.: *See*—
Sakai, Takeshi; and Ito, Tsuneo, 4,928,550, Cl. 74-595.000.
NEC Corporation: *See*—
Fukuda, Shinri, 4,929,916, Cl. 331-1.00A.
Hayano, Kiminori, 4,929,989, Cl. 357-23.600.
Honjo, Kazuhiko; and Tanaka, Shin-Ichi, 4,929,997, Cl. 357-34.000.
Horiguchi, Ryuji, 4,929,938, Cl. 340-747.000.
Horiguchi, Ryuji, 4,930,088, Cl. 364-518.000.
Katayose, Tsuyoshi; and Maehashi, Yukio, 4,930,068, Cl. 364-200.000.
Nakajima, Akira, 4,929,944, Cl. 341-24.000.
Nakamura, Michiya, 4,930,067, Cl. 364-200.000.
Ohmagari, Shinichi, 4,930,141, Cl. 375-60.000.
Shimizu, Hiroshi, 4,930,123, Cl. 370-94.100.
Sugihara, Shigeru, 4,930,118, Cl. 370-16.000.
Yamada, Masanori, 4,930,062, Cl. 363-55.000.
NEC Home Electronics Ltd.: *See*—
Ara, Kouichi, 4,929,937, Cl. 340-728.000.
Nedwig, Joachim: *See*—
ter Hasebrg, Jan L.; Nedwig, Joachim; and Kruse, Klaus-Dieter, 4,929,842, Cl. 250-551.000.
Neel, Donald V.: *See*—
Schonauer, Sylvia L.; Medina, Linda M.; and Neel, Donald V., 4,929,461, Cl. 426-438.000.
Negi, Shigeto: *See*—
Machida, Yoshimasa; Negi, Shigeto; Kamiya, Takashi; Komatu, Yuuki; Sugiyama, Isao; Kai, Yasunobu; Nakamura, Takaharu; Naito, Toshihiko; Kitoh, Kyosuke; Katsu, Kanemasa; and Yamauchi, Hiroshi, 4,929,612, Cl. 514-202.000.
Negi, Taichi: *See*—
Moritani, Tohei; Oda, Hidemasa; Sato, Toshiaki; Negi, Taichi; Matsumura, Keiji; Kawai, Syuji; Tanaka, Nobuo; and Hirofuji, Satoshi, 4,929,482, Cl. 428-36.400.
Negishi, Kozabro, to Sanden Corporation. Cold preserving container. 4,928,501, Cl. 62-406.000.
Negoro, Takaharu: *See*—
Kanaoka, Masaharu; Kawanaka, Chigusa; Negoro, Takaharu; and Agui, Hideo, 4,929,547, Cl. 435-69.100.
Nehring, Jurgen: *See*—
Bohnert, Klaus; Kaufmann, Meinolph; and Nehring, Jurgen, 4,929,830, Cl. 250-227.140.
Neiman, Richard D., to Vesper Corporation. Safety beam lock. 4,928,834, Cl. 211-191.000.
Nelepka, Guy S. Lightweight breathing device. 4,928,686, Cl. 128-205.240.
Neles Oy: *See*—
Kivipelto, Pekka J., 4,928,924, Cl. 251-315.000.
Nellcor Incorporated: *See*—
Nicolson, Susan C.; and Jobes, David R., 4,928,691, Cl. 128-633.000.
Nelson, Terry M.: *See*—
Chan, C. S.; Bearss, James G.; and Nelson, Terry M., 4,930,018, Cl. 358-298.000.
Nelson, William A., III. Multiple size cable testing device. 4,929,902, Cl. 324-542.000.
Nespor, Ronald R., to Chevron, Inc. Vehicle carrier with wheel lift. 4,929,142, Cl. 414-563.000.
Netsu, Tositada: *See*—
Takenaka, Takaji; Netsu, Tositada; Shigi, Hidetaka; and Yamamoto, Masakazu, 4,930,002, Cl. 357-75.000.
Neu, Max G.: *See*—
Butler, David R.; Snow, George; Sandford, Philip; Neu, Max G.; Villani, Jean P.; Teyssedre, Alain; and Lenoir, Roland, 4,928,746, Cl. 164-362.000.
Neurohr, Fred: *See*—
Rittenhouse, David A.; Neurohr, Fred; and Estridge, Doug R., 4,929,470, Cl. 427-55.000.
Neustadt, Bernard R.: *See*—
Haslanger, Martin F.; Neustadt, Bernard R.; and Smith, Elizabeth M., 4,929,641, Cl. 514-506.000.
Nevin, Ira; and Nath, Narendra, to Bakers Pride Oven Co. Enhanced air-flow convection oven. 4,928,663, Cl. 126-21.00A.
Newton, John: *See*—
Hendricks, Katherine A., 4,929,228, Cl. 600-27.000.
Newton, Trevor W.: *See*—
McArthur, Alastair; Davis, Royston H.; Hilton, Mark D.; Newton, Trevor W.; and Patel, Dinesh M., 4,929,628, Cl. 514-364.000.
NGK Insulators, Ltd.: *See*—
Abe, Fumio; Mori, Hiroshi; and Takagi, Shigekazu, 4,929,406, Cl. 264-45.500.
Kato, Nobuhide; and Hamada, Yasuhiko, 4,929,331, Cl. 204-426.000.
Nichols, Dwight E., to Hoover Group, Inc. Butterfly discharge valve assembly for a liquid bulk container. 4,928,922, Cl. 251-180.000.
Nichols, Jerram B.; Hunter, Douglas; Herrington, Ronald M.; Serratelli, John F.; and Carey, David G., to Dow Chemical Company, The. Polyurethane foam prepared using high functionality cell openers. 4,929,646, Cl. 521-137.000.
Nicholson, Roy V.: *See*—
Laughon, Thomas C.; Nicholson, Roy V.; Barrett, Michael E.; and Beckmann, Robert C., 4,928,913, Cl. 248-224.100.
Nickl, Josef; Heckel, Armin; Muller, Erich; Narr, Berthold; Weisenberger, Johannes; Eisert, Wolfgang; and Muller, Thomas, to Dr. Karl Thomae GmbH. Benzenesulphonamidoindanyl compounds. 4,929,754, Cl. 562-428.000.
Nicolay, David: *See*—
Plut, Leonard F.; and Nicolay, David, 4,930,144, Cl. 378-99.000.
Nicollet Technologies, Inc.: *See*—
Hagedorn, Guenter E., 4,930,153, Cl. 379-233.000.
Nicolson, Susan C.; and Jobes, David R., to Nellcor Incorporated. Lingual oximeter probe. 4,928,691, Cl. 128-633.000.
Nielson, Donald H., to Ramex Syn-Fuels International. Method and apparatus for shale gas recovery. 4,928,765, Cl. 166-251.000.
Niemeyer, Ulf: *See*—
Scheffler, Gerhard; Niemeyer, Ulf; Brock, Norbert; and Pohl, Jorg, 4,929,607, Cl. 514-110.000.
Nieminen, Jorma J.: *See*—
Hakulin, Bertel K.; and Nieminen, Jorma J., 4,929,255, Cl. 48-197.00R.
NIFCO, Inc.: *See*—
Ikeda, Yasuhiko, 4,928,364, Cl. 24-614.000.
Nii, Hiroki: *See*—
Kimura, Tetsuya; Fujii, Toshihiro; and Nii, Hiroki, 4,929,469, Cl. 427-54.100.
Niimi, Kikuo, to Kictec Incorporation. Lighting peg. 4,929,942, Cl. 340-908.100.
Niizato, Tomonori; Tanai, Tsuneo; Kasahara, Kazuhiro; Saka, Tsutomu; and Oikawa, Toshihiro, to Honda Giken Kogyo Kabushiki Kaisha. Lubricant supplying system for DOHC type multi-cylinder internal combustion engine. 4,928,641, Cl. 123-90.160.
Nikki Co., Ltd.: *See*—
Nakao, Haruki, 4,928,885, Cl. 239-417.000.
Nikolaus, Heinrich, to Mannesmann Rexroth GmbH. Control apparatus for double acting hydraulic cylinder units. 4,928,487, Cl. 60-414.000.
Nikon Corporation: *See*—
Imura, Yoshio; and Takahashi, Tsugio, 4,929,971, Cl. 354-75.000.
Ohkubo, Yukiharu; Hosoya, Manabu; Miura, Shinji; and Aoki, Yuichi, 4,928,936, Cl. 269-73.000.
Shibayama, Atsushi, 4,929,069, Cl. 350-423.000.
Niksuko Corporation: *See*—
Harakawa, Yoshihiro; Takahashi, Seiya; Izawa, Koji; Takeuchi, Hidemitsu; and Ikari, Keizo, 4,929,316, Cl. 204-56.100.
Nilson, Ronald: *See*—
Forman, Willis R., 4,928,614, Cl. 114-66.000.
Nilsson, Claes T.: *See*—
Jakobsen, Kjell M.; and Nilsson, Claes T., 4,929,168, Cl. 425-384.000.
Ninomiya, Naohisa: *See*—
Sawai, Kiichi; Kurono, Masayasu; Asai, Hiromiotu; Mitani, Takahiko; Ninomiya, Naohisa; Sugiyama, Takao; Furukawa, Eiji; and Michishita, Hisashi, 4,929,438, Cl. 424-10.000.
Nippon CMK Corp.: *See*—
Kawakami, Shin; Haruyama, Satoshi; and Okonogi, Hirotaka, 4,929,491, Cl. 428-195.000.
Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha: *See*—
Nakagawa, Sumio; Toiyama, Masaoki; Uno, Yoshinobu; and Kohda, Hiromichi, 4,929,768, Cl. 568-473.000.
Nippon Mektron Ltd.: *See*—
Sonoi, Takehiro; and Yamada, Okimasa, 4,929,686, Cl. 525-279.000.
Nippon Mining Co., Ltd.: *See*—
Kainosho, Keiji; Shimakura, Haruhito; and Oda, Osamu, 4,929,564, Cl. 437-20.000.
Nippon Oil Co., Ltd.: *See*—
Akanuma, Hideo; Murata, Masashi; Inoue, Kiyoshi; and Ohgake, Ryoji, 4,929,372, Cl. 252-29.000.
Matsubara, Saburo; Gohshi, Yoshihiro; Kobayashi, Seizo; and Usui, Katsumi, 4,929,680, Cl. 525-240.000.
Nippon Oil and Fats Co., Ltd.: *See*—
Kobashi, Rikizo; Takase, Shigeyuki; Enomoto, Hiroyuki; Hayasaki, Yasushi; Kobayashi, Toyohisa; and Yamazaki, Shingo, 4,929,685, Cl. 525-277.000.
Komai, Takeshi; Matsuyama, Kazuo; and Honma, Isao, 4,929,747, Cl. 558-263.000.
Nippon Precision Circuits Ltd.: *See*—
Toyama, Akira, 4,929,947, Cl. 341-146.000.
Nippon Sanso Kabushiki Kaisha: *See*—
Suwa, Toshio; Kobayashi, Nobuaki; and Hirano, Takashi, 4,928,605, Cl. 110-261.000.
Nippon Seiko Kabushiki Kaisha: *See*—
Osawa, Nobuyuki, 4,929,095, Cl. 384-45.000.
Osawa, Nobuyuki, 4,929,096, Cl. 384-45.000.
Takata, Hirotoshi; Suruga, Eihiro; and Inoue, Gentei, 4,929,098, Cl. 384-450.000.
Nippon Seimitsu Kogyo Kabushiki Kaisha: *See*—
Kubota, Mineo, 4,930,022, Cl. 358-451.000.
Nippon Sheet Glass Co., Ltd.: *See*—
Kitayama, Shinichiro; Adachi, Teruho; Ueda, Masahiro; Aoki, Yuichi; Shiiki, Satoshi; Takigawa, Akio; Yoshida, Motoaki; Imamura, Naoya; Maeda, Koichi; and Kayanoki, Hisayuki, 4,929,523, Cl. 430-4.000.
Nippon Steel Corporation: *See*—
Komatsu, Hajime; Tanino, Mitsuru; Suga, Yozo; and Konno, Toyohiko, 4,929,286, Cl. 148-111.000.
Nippon Thompson Co., Ltd.: *See*—
Mottate, Tatsuo, 4,929,097, Cl. 384-49.000.
Nippon Zeon Co., Ltd.: *See*—
Akita, Shuichi; Suzuki, Fumitoshi; Kikuchi, Yasushi; and Oishi, Hideyuki, 4,929,679, Cl. 525-194.000.

Nira, Hisami: *See*—
Tominaga, Mamoru; Kokado, Naoyuki; Gonpei, Katsuhiro; Nira, Hisami; and Taya, Akira, 4,929,061, Cl. 350-338.000.
Nishibori, Toshiki, to Sharp Kabushiki Kaisha. Sheet feeding arrangement. 4,928,943, Cl. 271-4.000.
Nishihara, Yoshio; Isobe, Noriyuki; and Kotera, Satoshi, to Ube Industries, Ltd. Heat-resistant paint comprising polymetallocarbosilane. 4,929,507, Cl. 428-447.000.
Nishikawa, Nobuo; and Misu, Hiroshi, to Fuji Photo Film Co., Ltd. Process for producing presensitized diazo resin lithographic printing plate using 1-methoxy-2-propanol as coating solvent. 4,929,533, Cl. 430-169.000.
Nishimura, Masakatsu; Okada, Naoya; Murata, Yasuo; and Hirai, Yasuhiko, to Tokuyama Soda Kabushiki Kaisha. Process for preparation of perfluoro organic compounds. 4,929,317, Cl. 204-59.00R.
Nishimura, Yoshifumi; Yamamoto, Susumu; Nakata, Hidekazu; Muraoka, Kiyoshige; Uchida, Mamoru; and Taguchi, Takafumi, to Sumitomo Electric Industries, Ltd.; and Sumitomo Rubber Industries, Ltd. Metal and composite material made of the metal and rubber. 4,929,512, Cl. 428-610.000.
Nishimura, Yoshihiro: *See*—
Otoshima, Hiroo; Tsuji, Hiroshi; Mori, Shigeki; and Nishimura, Yoshihiro, 4,928,476, Cl. 57-268.000.
Nishino, Hiroshi; Ejiri, Susumu; and Yokoyama, Nobuyoshi, to Paloma Kogyo Kabushiki Kaisha. Pulse combustion heating apparatus. 4,928,664, Cl. 126-391.000.
Nishio, Taichi: *See*—
Abe, Hiroomi; Nishio, Taichi; Suzuki, Yasurou; Sanada, Takashi; and Tsuji, Mitsuji, 4,929,675, Cl. 525-66.000.
Nishiyama, Gary S. Decorative cup. 4,928,412, Cl. 40-324.000.
Nissan Chemical Industries Ltd.: *See*—
Kohtoh, Noriaki; Tsuruoka, Yoshihiro; Abe, Toyohiko; and Fukuro, Hiroyoshi, 4,929,658, Cl. 524-219.000.
Nissan Motor Company, Limited: *See*—
Kiminami, Ikuo; Sakamoto, Hideyuki; and Nose, Toshimitsu, 4,928,499, Cl. 62-186.000.
Matayoshi, Yutaka; Yoshimura, Toru; Kamegaya, Shigeru; and Hamai, Kyugo, 4,928,650, Cl. 123-90.240.
Matsui, Shinichi, 4,928,935, Cl. 267-140.100.
Nakano, Masaki, 4,928,542, Cl. 74-200.000.
Suzuki, Yutaka, 4,930,080, Cl. 364-424.100.
Tamura, Hideyuki, 4,928,518, Cl. 73-117.300.
Nissen, Rudolph: *See*—
Shull, William; Nissen, Rudolph; and Drobshoff, Alexander, 4,928,756, Cl. 165-182.000.
Nitta, Jiro: *See*—
Daicho, Norio; Kawahara, Masakatsu; Nitta, Jiro; Miyazaki, Koji; and Yonezawa, Keitaro, 4,928,919, Cl. 251-89.000.
Nitta, Tomio, to Tokai Corporation. Noncontrolling type valve. 4,929,175, Cl. 431-344.000.
Nitta, Tomio, to Tokai Corporation. Noncontrolling type valve. 4,929,176, Cl. 431-344.000.
Nittan Company: *See*—
Suzuki, Takashi; and Amemiya, Hideto, 4,929,093, Cl. 374-208.000.
Niwa, Minoru: *See*—
Harada, Chikao; and Niwa, Minoru, 4,928,701, Cl. 128-677.000.
NKK Corporation: *See*—
Moriya, Yutaka; Sanpei, Tetsuya; and Tagawa, Hisatoshi, 4,929,289, Cl. 148-402.000.
Watanabe, Tsutomu; Sagiyama, Masari; Kawabe, Masaki; Tsujihara, Toshiyuki; and Takushima, Shigehiro, 4,929,323, Cl. 204-206.000.
Watanabe, Tsutomu; Sagiyama, Masaru; Kawabe, Masaki; Tsujihara, Toshiyuki; and Takushima, Shigehiro, 4,929,324, Cl. 204-206.000.
NL Petroleum Products Limited: *See*—
Shirley-Fisher, David N., 4,928,777, Cl. 175-329.000.
Nobileau, Philippe C.: *See*—
Milberger, Lionel J.; Nobileau, Philippe C.; and Watkins, Bruce J., 4,928,769, Cl. 166-382.000.
Nobumori, Shogo: *See*—
Ainoya, Masayuki; Ishihara, Takeyuki; Kanno, Tesuo; Kikuchi, Takahiro; Mori, Seiichi; Nobumori, Shogo; and Shirakawa, Junji, 4,929,982, Cl. 355-311.000.
Nodelman, Neil H., to Mobay Corporation. Use of ester group containing polyols in a rim process. 4,929,697, Cl. 528-77.000.
Noguchi, Hiroyuki; and Yamada, Ichiho, to Honda Giken Kogyo. Automotive door handle assembling robot. 4,928,385, Cl. 29-788.000.
Noguchi, Yasushi: *See*—
Maeda, Satoru; Noguchi, Yasushi; Yasuda, Kazunori; and Takano, Shyunsuke, 4,930,014, Cl. 358-209.000.
Nohara, Saburo: *See*—
Hagiwara, Zenji; Ando, Satoshi; and Nohara, Saburo, 4,929,431, Cl. 423-328.000.
NOK Corporation: *See*—
Nagasawa, Shinji, 4,928,979, Cl. 277-38.000.
Nokia Graetz: *See*—
Kornaker, Walter, 4,929,210, Cl. 445-73.000.
Nomura, Masaaki: *See*—
Yamada, Takashi; Nomura, Masaaki; Yamamoto, Ryoichi; Matsubaguchi, Satoshi; and Nahara, Akira, 4,929,320, Cl. 204-192.200.
Noomen, Arie; and Peters, Petrus J., to Akzo N.V. Aqueous coating composition containing a functional organic compound, a curing agent, and a dispersing agent. 4,929,661, Cl. 524-259.000.
Norcom Electronics Corporation: *See*—
Norris, Elwood G., 4,930,156, Cl. 379-388.000.
Norda S.P.A. Via Vallecamonica: *See*—
Duina, Gianfranco, 4,929,164, Cl. 425-145.000.
Norddeutsche Seekabelwerke AG: *See*—
Basse, Hartwig, 4,929,484, Cl. 428-53.000.
NORDICA S.P.A.: *See*—
Baggio, Giorgio; Gonella, Mario; and Sartor, Mariano, 4,928,408, Cl. 36-119.000.
Normalair-Garrett (Holdings) Limited: *See*—
Stevenson, George F.; Foote, James C.; and Hamlin, Humphrey A. S., 4,928,682, Cl. 128-202.260.
Norris, Elwood G., to Norcom Electronics Corporation. Telephone receiver transmitter device. 4,930,156, Cl. 379-388.000.
North American Philips Corporation: *See*—
Kaylor, William R.; and Fisher, Frederick A., 4,929,960, Cl. 343-703.000.
Sicignano, Albert; and Vaez-Iravani, Mehdi, 4,929,836, Cl. 250-397.000.
North American Specialities Corporation: *See*—
Taylor, Robert, 4,929,193, Cl. 439-567.000.
Northern Telecom Limited: *See*—
Sitch, John E., 4,930,036, Cl. 361-56.000.
Nose, Toshimitsu: *See*—
Kiminami, Ikuo; Sakamoto, Hideyuki; and Nose, Toshimitsu, 4,928,499, Cl. 62-186.000.
Noshi, Shinji: *See*—
Matsui, Isamu; Uehara, Masao; Noshi, Shinji; and Kawarabashi, Tsukasa, 4,928,475, Cl. 57-264.000.
Nossen, Steve J.: *See*—
Chandler, Donald G.; Nossen, Steve J.; and Simpson, Raymond W., 4,930,139, Cl. 375-1.000.
Nouvertne, Werner; Gielen, Franz-Josef; Tacke, Peter; Grigo, Ulrich; Quiring, Bernd; and Lindner, Christian, to Bayer Aktiengesellschaft. Mixtures of thermoplastic poly(ester) carbonates with thermoplastic polyurethanes. 4,929,674, Cl. 325-66.000.
Novack, Mitchell: *See*—
Hulsing, Rand H., II; and Novack, Mitchell, 4,929,860, Cl. 310-366.000.
Novik, Ofer: *See*—
Klier, Shimon; and Novik, Ofer, 4,928,665, Cl. 126-415.000.
Nowak, Jean-Francois: *See*—
Marquez, Edmundo M.; Nowak, Jean-Francois; and Robles, Antonio, 4,929,473, Cl. 427-252.000.
Nowlin, Bobby R. Bicycle buggy apparatus. 4,928,985, Cl. 280-204.000.
Nozaki, Nobuharu: *See*—
Hatori, Masami; Nozaki, Nobuharu; and Kamiyama, Kozi, 4,929,042, Cl. 350-96.130.
NRC Corporation: *See*—
Wong, Daniel T.; and Speraw, Floyd G., 4,929,185, Cl. 439-74.000.
Nubel, Karl-Heinz: *See*—
Sohner, Gerhard; Roth, Helmut; Brammer, Hartmut; Schleupen, Richard; and Nubel, Karl-Heinz, 4,928,660, Cl. 123-647.000.
NUKEM GmbH: *See*—
Worner, Jorg, 4,929,281, Cl. 136-201.000.
Numao, Takaji, to Sharp Kabushiki Kaisha. Method for driving a display device. 4,929,058, Cl. 350-333.000.
Nuova Italsider S.p.A.: *See*—
Bertolotti, Luigi, 4,928,454, Cl. 53-409.000.
Nuovo Consorzio Sanitario Nazionale: *See*—
Ferruti, Paolo; and Scapini, Giancarlo, 4,929,750, Cl. 560-87.000.
Nuovopignone-Industrie Meccaniche e Fonderia, S.p.A.: *See*—
Vinciguerra, Constantino; and Coppini, Massimo, 4,929,119, Cl. 403-359.000.
Nurczyk, Mark E., to American Standard Inc. VaV valve with PWM hot water coil. 4,928,750, Cl. 165-2.000.
Nuti, Marco, to Piaggio & C. S.p.A. Automatic transmission for vehicles in general. 4,928,555, Cl. 74-745.000.
NuTone, Inc.: *See*—
Krebs, Werner W., 4,930,054, Cl. 362-149.000.
Nutter, Norman E., to General Electric Company. Turbine trip throttle valve control system. 4,929,148, Cl. 415-32.000.
Nuyens, Angela M.: *See*—
Resnick, Susan D.; and Nuyens, Angela M., 4,929,211, Cl. 446-14.000.
NWL Transformers: *See*—
Del Gatto, Henry J.; and Trainor, John E., 4,928,456, Cl. 55-12.000.
Nynex Corporation: *See*—
Citron, Howard; Chan, Eric; and Dolan, Michael, 4,930,157, Cl. 379-433.000.
Nys, Jacques: *See*—
Lagarde, Robert; Ariagno, Daniel; and Nys, Jacques, 4,929,460, Cl. 426-420.000.
O&K Orenstein & Koppel Aktiengesellschaft: *See*—
Maury, Hans-Dietmar; and Buslowski, Wolfgang, 4,929,178, Cl. 432-14.000.
Oberjatzas, Gunter; and Keesen, Heinz-Werner, to Deutsche Thomson Brandt GmbH. Arrangement for indicating angular position of head-wheel disk in a tape recorder. 4,930,025, Cl. 360-64.000.
Obrecht, Daniel: *See*—
Fischli, Albert; Gutknecht, Eva-Maria; and Obrecht, Daniel, 4,929,741, Cl. 549-447.000.
O'Brien, John T.; Thomas, Neil L.; and Dyer, Tracy D., to Storage Technology Corporation. Adaptive data compression apparatus including run length encoding for a tape drive system. 4,929,946, Cl. 341-87.000.

Occidental Chemical Corporation: *See*—
Emmett, John E., 4,928,579, Cl. 92-248.000.

Ocean Farms of Hawaii Limited Partnership: *See*—
Lockwood, George S., 4,929,124, Cl. 405-165.000.

Ochiai, Kuniaki; and Komakine, Shigeo, to Tokyo Electric Company, Ltd. Release-type dot print head. 4,929,101, Cl. 400-124.000.

O'Connell, Cormac M.: *See*—
Davies, Thomas J.; Seevinck, Evert; Pfennings, Leonardus C. M. G., deceased; Kessen, Henricus J.; Voss, Peter H.; O'Connell, Cormac M.; Phelan, Cathal G.; and Ontrop, Hans, 4,929,911, Cl. 330-264.000.

O'Connor, Daniel G.; and Gerth, Howard L., to United States of America, Energy. Hydrostatic self-aligning axial/torsional mechanism. 4,928,532, Cl. 73-856.000.

Oda, Hidemasa: *See*—
Moritani, Tohei; Oda, Hidemasa; Sato, Toshiaki; Negi, Taichi; Matsumura, Keiji; Kawai, Syuji; Tanaka, Nobuo; and Hirofuji, Satoshi, 4,929,482, Cl. 428-36.400.

Oda, Mitsunori: *See*—
Suzuki, Akinori; Hyeon, Suong B.; Kajita, Toshio; Furushima, Masakazu; Yoshinaka, Shigeo; Suzuki, Takashi; Oda, Mitsunori; and Tanaka, Akinori, 4,929,267, Cl. 71-77.000.

Oda, Osamu: *See*—
Kainosho, Keiji; Shimakura, Haruhito; and Oda, Osamu, 4,929,564, Cl. 437-20.000.

Oda, Susumu: *See*—
Suzuki, Toshitake;; Komoda, Norio; Oda, Susumu; and Harata, Motoo, 4,929,859, Cl. 310-328.000.

Oellerer, Friedrich: *See*—
Theurer, Josef; Oellerer, Friedrich; and Gruber, Leopold R., 4,929,816, Cl. 219-53.000.

Office Nationanl D'Etudes Et De Recherches Aerospatiales styled O.N.E.R.A: *See*—
Delfour, Andre ; Falempin, Francois; Isbert, Jacques; and Sans, Claude, 4,929,079, Cl. 356-336.000.

Ogawa, Hiroshi: *See*—
Ando, Tsuyoshi; Hirono, Nakayasu; Nakao, Hirotoshi; Mito, Akio; Kihara, Kazuyuki; Hatakenaka, Kosuke; and Ogawa, Hiroshi, 4,928,730, Cl. 137-554.000.
Funahashi, Nobuhiro; Yamashita, Toshio; and Ogawa, Hiroshi, 4,928,500, Cl. 62-193.000.

Ogawa, Yoshitake, to Brother Kogyo Kabushiki Kaisha. Sewing machine with guide and ironing means for folding back and pressing stitched fabric margins. 4,928,611, Cl. 112-217.000.

Ogden, Ralph; and Huik, Heikki. Adjustable mattress foundation for beds. 4,928,332, Cl. 5-68.000.

Ogoe, Samuel A.: *See*—
Laughner, Michael K.; and Ogoe, Samuel A., 4,929,663, Cl. 524-423.000.

Ogura, Ryushi: *See*—
Matsui, Fumio; Suzuki, Noboru; Takaishi, Minoru; Ogura, Ryushi; Harigai, Noriaki; Hashimoto, Tadayoshi; and Uematu, Tomoe, 4,929,494, Cl. 428-286.000.

Ohara, Shunji: *See*—
Kato, Makoto; Saimi, Tetsuo; and Ohara, Shunji, 4,929,823, Cl. 250-201.500.

Ohashi, Michihiro: *See*—
Taguchi, Seizo; Oketani, Toshiharu; Ohashi, Michihiro; Tanaka, Hideaki; and Terao, Hiroshi, 4,929,092, Cl. 374-183.000.

Ohba, Kiyoshi: *See*—
Emura, Tatuo; and Ohba, Kiyoshi, 4,929,453, Cl. 426-63.000.
Emura, Tatuo; and Ohba, Kiyoshi, 4,929,558, Cl. 435-252.500.

Ohchi, Torao: *See*—
Hiramatsu, Tohru; Tami, Kazuya; and Ohchi, Torao, 4,928,612, Cl. 112-257.000.

Ohgake, Ryoji: *See*—
Akanuma, Hideo; Murata, Masashi; Inoue, Kiyoshi; and Ohgake, Ryoji, 4,929,372, Cl. 252-29.000.

Ohgen Research Laboratories, Limited: *See*—
Kanaoka, Masaharu; Kawanaka, Chigusa; Negoro, Takaharu; and Agui, Hideo, 4,929,547, Cl. 435-69.100.

Ohio Gratings, Inc.: *See*—
Bartley, David W., 4,928,471, Cl. 52-664.000.

Ohio State University, The: *See*—
Hsu, Hsiung, 4,928,697, Cl. 128-649.000.

Ohishi, Takeshi: *See*—
Uesugi, Akio; Dobashi, Ritsu; and Ohishi, Takeshi, 4,929,326, Cl. 204-206.000.

Ohkawa, Hideki; and Ozawa, Norio, to Kabushiki Kaisha Toshiba. Information storage medium and method of manufacturing the same. 4,929,485, Cl. 428-64.000.

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Ohnishi, Mutsuhiko: *See*—
Kurauchi, Makoto; Hashimoto, Michio; Hayasaki, Kiyoshi; Minami, Toshikazu; Ohnishi, Mutsuhiko; and Suzuki, Yohei, 4,929,650, Cl. 523-455.000.

Ohnishi, Seiichiro: *See*—
Kyono, Tetsuyuki; Ohnishi, Seiichiro; Hanano, Tohru; and Hotta, Tohru, 4,929,513, Cl. 428-611.000.

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Ohno, Shigeru: *See*—
Kato, Eiichi; Ohno, Shigeru; Ishii, Kazuo; and Itakura, Ryosuke, 4,929,527, Cl. 430-92.000.

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Hamada, Akihiko; Hiraoka, Hidenori; Nakamura, Yoshinobu; and Ohtsuru, Hiroshi, 4,929,678, Cl. 525-193.000.

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Niizato, Tomonori; Tansi, Tsuneo; Kasahara, Kazuhiro; Saka, Tsutomu; and Oikawa, Toshihiro, 4,928,641, Cl. 123-90.160.

Oishi, Hideyuki: *See*—
Akita, Shuichi; Suzuki, Fumitoshi; Kikuchi, Yasushi; and Oishi, Hideyuki, 4,929,679, Cl. 525-194.000.

Oishi, Kunio: *See*—
Wakayama, Sachio; Ishikawa, Fumiyasu; and Oishi, Kunio, 4,929,548, Cl. 435-71.200.

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Nishimura, Masakatsu; Okada, Naoya; Murata, Yasuo; and Hirai, Yasuhiko, 4,929,317, Cl. 204-59.00R.

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Fujie, Naofumi; Imaizumi, Tomoaki; Ito, Koji; and Okada, Shoji, 4,929,072, Cl. 350-582.000.

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Okada, Yoshiyuki, to Fujitsu Limited. Process and apparatus for reducing a picture with fine line disappearance prevention. 4,930,021, Cl. 358-451.000.

Okamori, Shuhei: *See*—
Yokoi, Takeshi; and Okamori, Shuhei, 4,929,104, Cl. 400-605.000.

Okamoto, Mitsunari: *See*—
Osaka, Tatsuhiko; Terawaki, Hiroshi; and Okamoto, Mitsunari, 4,929,330, Cl. 204-402.000.

Okano, Yoshihiro: *See*—
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Okazaki, Seiji: *See*—
Masaka, Mitsuke; Hatanaka, Koji; Maruta, Kenji; and Okazaki, Seiji, 4,929,813, Cl. 219-270.000.

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Taguchi, Seizo; Oketani, Toshiharu; Ohashi, Michihiro; Tanaka, Hideaki; and Terao, Hiroshi, 4,929,092, Cl. 374-183.000.

Oki Electric Co., Ltd.: *See*—
Mizutani, Minoru; Kikuchi, Hiroshi; Watanabe, Shoichi; Hayashi, Kuniharu; and Maekawa, Masanori, 4,929,102, Cl. 400-248.000.

Oki Electric Industry Co., Ltd.: *See*—
Hatakeyama, Motonobu; Yoshimura, Kohtaroh; Naoi, Hidenori; and Wakasugi, Nobuo, 4,930,089, Cl. 361-519.000.
Ueda, Kenichi; Hattori, Kouji; Terada, Akihiko; and Inohara, Kazuyoshi, 4,929,934, Cl. 340-706.000.

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Harmon, Harold J., 4,929,078, Cl. 356-320.000.

Okonogi, Hirotaka: *See*—
Kawakami, Shin; Haruyama, Satoshi; and Okonogi, Hirotaka, 4,929,491, Cl. 428-195.000.

Oku, Masahiro; and Iwamura, Kazumitsu, to Sumitomo Rubber Industries, Ltd. Pneumatic radial tire. 4,928,742, Cl. 152-534.000.

Okuhara, Masakuni; Tanaka, Hirokazu; Goto, Toshio; Kino, Tohru; and Hatanaka, Hiroshi, to Fujisawa Pharmaceutical Company, Ltd. Method for immunosuppression. 4,929,611, Cl. 514-183.000.

Okuno, Itaru: *See*—
Shinya, Yoshiyuki; Tabara, Yoshitaka; Okuno, Itaru; Kaneko, Tadashi; and Watanabe, Tomomi, 4,928,652, Cl. 123-417.000.

Okuyama, Toshiharu: *See*—
Shimizu, Giichiro; Shimizu, Misao; Takeuchi, Hajime; Okuyama, Toshiharu; and Wakatuski, Yoshio, 4,930,096, Cl. 364-550.000.

Okuzawa, Yasutoshi: *See*—
Miyoshi, Takahito; Kanazawa, Minoru; Sugisaki, Tsutomu; Yamada, Takuzi; and Okuzawa, Yasutoshi, 4,930,032, Cl. 360-132.000.

Oldenburg, Willem; Hemmes, Simon N.; and Hobbel, Jaap E., to Lever Brothers Company. Particulate detergent composition. 4,929,379, Cl. 252-109.000.

Oldengott, Hans: *See*—
Breidenbach, Dieter; Oldengott, Hans; and Vitt, Burckard, 4,929,179, Cl. 432-247.000.

Oldfelt, Sven: *See*—
Olin, Henry; Lindroos, Gunnar; and Oldfelt, Sven, 4,928,326, Cl. 4-300.000.

Olin Corporation: *See*—
Casberg, John M., 4,928,813, Cl. 206-0.500.

Pryor, Michael J.; Fister, Julius C.; Singhdeo, Narendra N.; Mahulikar, Deepak; and Cherukuri, Satyam C., 4,929,516, Cl. 428-620.000.

Rooney, James F.; and Cheskis, Harvey P., 4,928,512, Cl. 72-404.000.

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Freeman, Anthony; Blacknell, David; Quegan, Shaun; Ward, Ian A.; Oliver, Christopher J.; Finley, Ian P.; White, Richard G.; and Wood, James W., 4,929,950, Cl. 342-25.000.

Oliver, Wayne R.; Moyer, Roy E.; and Girardin, Dennis R., to General Electric Company. Separator having multiple particle extraction passageways. 4,928,480, Cl. 60-39.092.

Olson, Dennis G.: *See*—
Huebner, Patrick H.; Sebranek, Joseph G.; Olson, Dennis G.; and Anderson, Eugene A., 4,928,892, Cl. 241-82.500.

Olsson, Staffan, to Flyct AB. Method to control stops of an intermittently operating driving motor. 4,929,875, Cl. 318-362.000.

Olympus Optical Co., Ltd.: *See*—
Matsumoto, Kazuya, 4,929,994, Cl. 357-30.000.
Sasai, Tsuguhisa, 4,928,699, Cl. 128-662.060.
Yokota, Akira; and Kuga, Masao, 4,929,070, Cl. 350-432.000.

O'Mara, William E., Jr.: *See*—
Beasom, James D.; and O'Mara, William E., Jr., 4,929,568, Cl. 437-40.000.

Omega SA: *See*—
Gagnebin, Gaston, 4,928,359, Cl. 24-71.00J.

Omura, Etsuji; and Namizaki, Hirofumi, to Mitsubishi Denki Kabushiki Kaisha. Method of making a buried crescent laser with air gap insulator. 4,929,571, Cl. 437-129.000.

O'Neill Communications, Inc.: *See*—
Chandler, Donald G.; Nossen, Steve J.; and Simpson, Raymond W., 4,930,139, Cl. 375-1.000.

Ono, Tetsuo: *See*—
Itahana, Tsutomu; Kanno, Hideo; Ono, Tetsuo; Furuta, Futoru; Kobayashi, Susumu; Akimoto, Ryosaku; and Tanigaki, Ryuhei, 4,928,723, Cl. 137-116.300.

Ontrop, Hans: *See*—
Davies, Thomas J.; Seevinck, Evert; Pfennings, Leonardus C. M. G., deceased; Kennen, Henricus J.; Voss, Peter H.; O'Connell, Cormac M.; Phelan, Cathal G.; and Ontrop, Hans, 4,929,911, Cl. 330-264.000.

Ookawa, Norio: *See*—
Satou, Hiroyuki; and Ookawa, Norio, 4,928,897, Cl. 242-55.000.

Opower, Hans, to Deutsche Forschungsanstalt fuer Luft- und Raumfahrt. Waveguide laser system. 4,930,138, Cl. 372-95.000.

Orpengen Medizinisch-Molekularbiologische Forschungsgesellschaft mbH: *See*—
Kunz, Horst; and Dombo, Berthold, 4,929,671, Cl. 525-54.110.

Ortloff, Donald J.: *See*—
Landriault, L. Steven; Ortloff, Donald J.; and Bollfrass, Charles A., 4,928,999, Cl. 285-113.000.

Osaka, Tatsuhiko; Terawaki, Hiroshi; and Okamoto, Mitsunari, to Daikin Industries, Ltd. Diffusion-limiting membrane holding means for sensor. 4,929,330, Cl. 204-402.000.

Osarek, Werner; Pempera, Franz G.; and Schoeert, Dieter, to Mannesmann AG. Equipment for surface treatment of continuously, running strips particularly pickling equipment. 4,928,717, Cl. 134-64.00R.

Osawa, Nobuyuki, to Nippon Seiko Kabushiki Kaisha. Ball retainer of a linear guide apparatus. 4,929,095, Cl. 384-45.000.

Osawa, Nobuyuki, to Nippon Seiko Kabushiki Kaisha. Linear guide apparatus. 4,929,096, Cl. 384-45.000.

Osgar, Michael L., to Fluoroware, Inc. Welding fluoropolymer pipe and fittings. 4,929,293, Cl. 156-158.000.

Oshikoshi, Yuji; Suganuma, Yoshimi; Hara, Hiroshi; Shiota, Kazuo; Takehara, Nobumitsu; and Sakamoto, Kiichiro, to Fuji Photo Film Co., Ltd. Booklet with photograph. 4,928,996, Cl. 283-109.000.

Oshima, Taku: *See*—
Fukayama, Yukio; and Oshima, Taku, 4,928,604, Cl. 110-103.000.

Oshiro, Takashi: *See*—
Eguchi, Tamotsu; Oshiro, Takashi; Kuge, Yukihiro; Mochida, Kenichi; and Uwajima, Takayuki, 4,929,551, Cl. 435-106.000.

Oshman's Sporting Goods, Inc.: *See*—
Perryman, John S., 4,928,535, Cl. 73-862.020.

Oskam, Herman, to Hunter Douglas International N.V. Clutch for a vertical louvre blind. 4,928,744, Cl. 160-178.100.

Osteo-Dyne, Inc.: *See*—
Bassett, C. Andrew L.; and Cook, Ian A., 4,928,959, Cl. 272-96.000.

Ostreicher, Eugene A.: *See*—
Meyering, Mark T.; and Ostreicher, Eugene A., 4,929,354, Cl. 210-321.610.

Otani, Masahiro: *See*—
Kimura, Toshio; Okano, Yoshihiro; Otani, Masahiro; and Miyamoto, Shigenobu, 4,930,090, Cl. 364-520.000.

Otis Engineering Corporation: *See*—
Gazda, Imre I.; and Collins, Dannie R., 4,928,761, Cl. 166-123.000.

Otomura, Keiichiro; Yamashita, Takayuki; Kanemitsu, Setsuo; Nakabayashi, Shigetoshi; and Miki, Hideo, to Doryokuro Kakunenryo Kaihatsu Jigyodan. Process for preparation of uranium tetrafluoride. 4,929,430, Cl. 423-11.000.

Otora, Takahito: *See*—
Ishikawa, Tadashi; Tagami, Shigeru; Akimoto, Kazuo; Tsuyuki, Hiroto; Kawai, Michio; Ito, Kanji; Sato, Takayuki; Otora, Takahito; and Hayakawa, Teruyo, 4,929,977, Cl. 354-420.000.

Otoshima, Hiroo; Tsuji, Hiroshi; Mori, Shigeki; and Nishimura, Yoshihiro, to Murata Kikai Kabushiki Kaisha. Two-for-one twisting machine. 4,928,476, Cl. 57-268.000.

Otsubo, Kazumi, to Honda Giken Kogyo Kabushiki Kaisha. Gas damped deceleration switch. 4,929,805, Cl. 200-61.45R.

Ottieri, Marco T. Ski boot having a hinged sole. 4,928,407, Cl. 36-119.000.

Otto Engineering, Inc.: *See*—
Roeser, John O.; and Graham, Bruce L., 4,929,808, Cl. 200-467.000.

Overbeck, Wayne W. Variable intake manifold. 4,928,638, Cl. 123-52.00M.

Overmann, John L., to Hamilton Fixture Company. Adjustable merchandise display rack. 4,928,832, Cl. 211-187.000.

Overton, David H.: *See*—
Pace, Gary L.; and Overton, David H., 4,929,910, Cl. 330-257.000.

Overton, Duncan E., Jr. Powder spray booth with overspray collection system. 4,928,624, Cl. 118-308.000.

Ovonic Imaging Systems, Inc.: *See*—
Yaniv, Zvi; Cannella, Vincent D.; Hansell, Gregory L.; and Swartz, Louis D., 4,929,569, Cl. 437-51.000.

Owen, Hartley: *See*—
Harandi, Mohsen N.; and Owen, Hartley, 4,929,334, Cl. 208-91.000.
Herbst, Joseph A.; Owen, Hartley; and Schipper, Paul H., 4,929,337, Cl. 208-120.000.
Wright, Bernard S.; Gould, Ronald M.; and Owen, Hartley, 4,929,780, Cl. 585-303.000.

Owens-Corning Fiberglas Corporation: *See*—
Gauchel, James V.; Wilson, Edward L.; and Kerle, Edward J., 4,929,651, Cl. 523-505.000.

Oy Parton Ab: *See*—
Paakkonen, Taisto; Veijo, Vainino; and Jarkko, Turpeinen, 4,929,019, Cl. 296-223.000.

Oy Uponor AB: *See*—
Agren, Lennart; and Holso, Eino, 4,929,409, Cl. 264-508.000.

Oy Wartsila Ab: *See*—
Olin, Henry; Lindroos, Gunnar; and Oldfelt, Sven, 4,928,326, Cl. 4-300.000.

Oyabu, Norio: *See*—
Ban, Kazuki; and Oyabu, Norio, 4,929,667, Cl. 524-718.000.

Oyamada, Yoshinori: *See*—
Matsuo, Teruo; Ihara, Tadayoshi; and Oyamada, Yoshinori, 4,929,209, Cl. 445-6.000.

Ozawa, Norio: *See*—
Ohkawa, Hideki; and Ozawa, Norio, 4,929,485, Cl. 428-64.000.

P. D. Enterprises, Inc.: *See*—
Carpenter, Paul R., 4,928,986, Cl. 280-234.000.

Paakkonen, Taisto; Veijo, Vainino; and Jarkko, Turpeinen, to Oy Parton Ab. Device for opening and closing the roof hatch of a vehicle. 4,929,019, Cl. 296-223.000.

Pace, Gary L., to Motorola, Inc. Data limiter for a radio pager. 4,929,851, Cl. 307-359.000.

Pace, Gary L.; and Overton, David H., to Motorola, Inc. Low current amplifier with controlled hysteresis. 4,929,910, Cl. 330-257.000.

Pacione, Albert J. Attachment for a squeeze mop. 4,928,341, Cl. 15-105.000.

Pagano, Thomas S.; and Turtle, RObert R., to Santa Barbara Research Center. Five mirror, two perpendicular plane image derotator. 4,929,040, Cl. 350-6.500.

Palitex Project Company GmbH: *See*—
Frentzel-Beyme, Johannes, 4,928,463, Cl. 57-58.860.

Palmer, Charles C.: *See*—
Kravitz, Jeffrey K.; and Palmer, Charles C., 4,930,159, Cl. 380-23.000.

Palmeri, Richard P. Bathroom assembly for handicapped individuals. 4,928,329, Cl. 4-552.000.

Palmieri, Joseph M.: *See*—
Meiners, David J.; Morris, Robert A.; Arnold, David; Castonguay, Roger N.; and Palmieri, Joseph M., 4,929,920, Cl. 335-202.000.

Paloma Kogyo Kabushiki Kaisha: *See*—
Nishino, Hiroshi; Ejiri, Susumu; and Yokoyama, Nobuyoshi, 4,928,664, Cl. 126-391.000.

Pan, Wie-Hin: *See*—
Hegedus, Louis; Beeckman, Jean W.; Pan, Wie-Hin; and Solar, Jeffrey P., 4,929,586, Cl. 502-217.000.

Pannold, Reinhard: *See*—
Muhrer, Gerhard; Pannold, Reinhard; and Boschanig, Reinhard, 4,928,523, Cl. 73-167.000.

Pansiera, Timothy. Knee brace with flexible secondary joint. 4,928,676, Cl. 128-80.00F.

Pao, Gei-Jon: *See*—
McLagan, Angus; Pao, Gei-Jon; Un, Chong S.; and Pearce, John J., Jr., 4,930,065, Cl. 364-200.000.

Papastavros, Demos. Turbine housing power system with gear housing. 4,928,490, Cl. 60-670.000.

Pappas, James L.: *See*—
Seiler, Larry D.; Pappas, James L.; and Rose, Robert C., 4,929,889, Cl. 371-22.300.

Paquin, Patrick J.; and Baran, Robert L., to Amphenol Corporation. Press for use in aligning and terminating flat cable. 4,928,379, Cl. 29-566.300.

Park, Hyung M.; and Kim, Dong G., to Electronics and Telecommunications Research Institute; and Korea Telecommunication Authority. Method of manufacturing a self-aligned GaAs MESFET with T type tungsten gate. 4,929,567, Cl. 437-41.000.

Park, Seung M. Stationary member on automotive hub cap. 4,929,030, Cl. 301-37.00N.

Park, Yong-bo: *See*—
Kim, Byeng-yun; and Park, Yong-bo, 4,929,853, Cl. 307-475.000.

Parker, Norman W.; and Robinson, William P., to MicroBeam Inc. Focused ion beam column. 4,929,839, Cl. 250-492.300.

Parks, Lee R.; and Kittrell, Wiley A., to Parks, Lee R. Powered portable wringer. 4,928,505, Cl. 68-253.00R.

Parrillo, Louis C., to Motorola, Inc. High/low doping profile for twin well process. 4,929,565, Cl. 437-34.000.

Parschat, Lothar: *See*—
Pleschiutschnigg, Fritz-Peter; Moellers, Gerd; Eberhardt, Hans-Georg; Rahmfeld, Werner; Parschat, Lothar; and Ehrenberg, Hans-Juergen, 4,928,747, Cl. 164-418.000.

Partain, Emmett M., III; and Brode, George L., II, to Union Carbide Chemicals and Plastics Company Inc. Acid decrystallization of aminopolysaccharides and derivatives thereof. 4,929,722, Cl. 536-20.000.

Parulekar, Vivekanand N.: *See*—
Moser, Mark D.; Lawson, R. Joe; Antos, George J.; Wang, Li; and Parulekar, Vivekanand N., 4,929,332, Cl. 208-65.000.
Moser, Mark D.; Lawson, R. Joe; Wang, Li; and Parulekar, Vivekanand N., 4,929,333, Cl. 208-65.000.

Pascal, Ives R.: *See*—
Calvet, Alain P.; Junien, Jean-Louis; Pascal, Ives R.; Pascaud, Xavier B.; and Roman, Francois J., 4,929,614, Cl. 514-214.000.

Pascaud, Xavier B.: *See*—
Calvet, Alain P.; Junien, Jean-Louis; Pascal, Ives R.; Pascaud, Xavier B.; and Roman, Francois J., 4,929,614, Cl. 514-214.000.

Pasdera, Leonard A.: *See*—
Steele, Robert B.; and Pasdera, Leonard A., 4,930,027, Cl. 360-70.000.

Pasek, Eugene A.; and Morgan, Norman C., to Chevron Research Company. Vanadium passivation in a hydrocarbon catalytic cracking process. 4,929,583, Cl. 502-64.000.

Patel, Dinesh M.: *See*—
McArthur, Alastair; Davis, Royston H.; Hilton, Mark D.; Newton, Trevor W.; and Patel, Dinesh M., 4,929,628, Cl. 514-364.000.

Patin, Michel: *See*—
Delarue, Jean-Jacques; Patin, Michel; and Slama, Jean-Claude, 4,929,135, Cl. 411-354.000.

Patrick, Bruce M.: *See*—
Kanafani, Hanny; Patrick, Bruce M.; and Atwell, William A., 4,929,465, Cl. 426-552.000.

Patterson, James A. Irrigation system. 4,928,427, Cl. 47-58.000.

Patterson, William A.; Tong, Dien H.; and Wooden, James R., to International Business Machines Corp. Taut band piezoelectric actuator for wire matrix printing elements. 4,929,100, Cl. 400-124.000.

Paul, Christopher R., to Coherent Communications Systems Corp. Noise suppression in recovery of clock from NRZ data. 4,929,849, Cl. 307-269.000.

Paul, Ernst, to LINGL GmbH & Co. KG. Transfer apparatus for laterally transferring kiln cars between tunnel kilns. 4,929,177, Cl. 432-11.000.

Paul, Lyle E., to Allergan, Inc. Lens container assembly. 4,928,815, Cl. 206-5.100.

Paulat, Volker: *See*—
Mazanek, Jan; von Gizycki, Ulrich; Muller, Hanns P.; Wienkenhover, Martin; Wieser, Karl-Heinz; Paulat, Volker; Theuer, Werner; and Muller, Walter, 4,929,705, Cl. 528-49.000.

Paull, James B., to Industrial Energy Corporation. Heat exchange recovery method. 4,928,749, Cl. 165-1.000.

Pavliv, Leo: *See*—
Sredni, Benjamin; Pavliv, Leo; and Albeck, Michael, 4,929,739, Cl. 549-347.000.

Pavljuk, Vladimir D.: *See*—
Tikhonovich, Vadim I.; Pavljuk, Vladimir D.; Vinokur, Bertold B.; Kondratjuk, Stanislav E.; Lutsenko, Georgy G.; Edemsky, Vladimir K.; Kiselev, Vladimir B.; Karasev, Nikolai M.; and Myakishev, Anatoly K., 4,929,416, Cl. 420-12.000.

Pawlikowski, Mark A. Non-reusable hypodermic syringe. 4,929,231, Cl. 604-110.000.

Paxman, David H.: *See*—
Bird, Philip H.; Coe, David J.; Paxman, David H.; and Korteling, Aart G., 4,929,884, Cl. 323-313.000.

Payer, Wolfgang; Bulmen, Heinz D.; and Zoller, Wilhelm, to Hoechst Aktiengesellschaft. Copolymers of ethylene and methoxyacetic acid vinyl ester and their use as additives for mineral oil distillates. 4,928,720, Cl. 137-13.000.

Pearce, John J., Jr.: *See*—
McLagan, Angus; Pao, Gei-Jon; Un, Chong S.; and Pearce, John J., Jr., 4,930,065, Cl. 364-200.000.

Pearl Musical Instrument Co.: *See*—
Yanagisawa, Mitsuo, 4,928,566, Cl. 84-413.000.

Pearson, Dennis G.: *See*—
Reisener, Delbert C.; and Pearson, Dennis G., 4,928,997, Cl. 285-13.000.

Peczkowski, Joseph L., to Allied-Signal Inc. Nonlinear multivariable control system. 4,928,484, Cl. 60-240.000.

Pedersen, George C. Tower packing cartridge. 4,929,398, Cl. 261-94.000.

Pedrow, John. Orthopedic pillow and sizing kit therefor. 4,928,335, Cl. 5-436.000.

Peerless Industries, Inc.: *See*—
Snodell, W. S., 4,928,914, Cl. 248-274.000.

Pegel, Karl H.; and Walker, Hans, to Rooperal (NA) NV. Use of phytosteryl glycosides for the treatment of epoxycholesterol levels. 4,929,603, Cl. 514-26.000.

Pelton & Crane Company, The: *See*—
Jones, Arthur L.; and McGaha, George, 4,930,058, Cl. 362-400.000.

Pempera, Franz G.: *See*—
Osarek, Werner; Pempera, Franz G.; and Schonert, Dieter, 4,928,717, Cl. 134-64.00R.

Penetrators, Inc.: *See*—
Schellstede, Herman J.; McQueen, Robert W.; and Peters, Alan D., 4,928,757, Cl. 166-55.100.

Pennev, Penio; Rajagopalan, Parthasarathi; and Scribner, Richard M., to Du Pont de Nemours, E. I., and Company. Benzo-fused cycloalkane and oxa- and thia-, cycloalkane trans-1,2-diamine derivatives. 4,929,627, Cl. 514-320.000.

Penno, Gianluca. An accessory for attachment of promotional characters to pens, key holders and the like. 4,928,416, Cl. 40-618.000.

Pennzoil Products Company: *See*—
Venier, Clifford G.; and Casserly, Edward W., 4,929,782, Cl. 585-375.000.

Pepper, Kenneth V. Apparatus for producing a helical tube. 4,929,167, Cl. 425-325.000.

Perez, Maria I. Assembly pieces for metallic carpentry sections. 4,928,470, Cl. 56-656.000.

Performance Attainment Associates, Inc.: *See*—
Allison, John D.; and Hanson, Gordon, 4,928,709, Cl. 128-782.000.

Pergerson, Gregory, to E-Systems, Inc. Tape cleaner and degausser apparatus. 4,930,033, Cl. 360-137.000.

Perkin-Elmer Corporation, The: *See*—
Ahmad, Anees; and Huse, Richard L., 4,929,054, Cl. 350-252.000.
Rotolico, Anthony J., 4,928,879, Cl. 239-8.000.
Vorreiter, John W.; and Dean, Robert L., 4,929,139, Cl. 414-217.000.

Permaflex Company: *See*—
Kaczmarek, James S.; and Kareta, Kenneth C., 4,928,383, Cl. 29-711.000.

Perrillat-Amede, Denis: *See*—
Long, Jacques; and Perrillat-Amede, Denis, 4,929,151, Cl. 415-177.000.

Perry, David: *See*—
Dutton, Christopher; and Perry, David, 4,929,638, Cl. 514-450.000.

Perry, Ralph; and Weaver, Edgar N., Jr. Method and course for playing a golf-like game. 4,928,973, Cl. 273-176.00A.

Perryman, John S., to Oshman's Sporting Goods, Inc. Methods and apparatus for measuring ski boot binding torque. 4,928,535, Cl. 73-862.020.

Persluchtring Advies B.V.: *See*—
Bloemendal, Berend J.; and Bromhaar, Marinus J. G., 4,928,926, Cl. 254-93.00R.

Peters, Alan D.: *See*—
Schellstede, Herman J.; McQueen, Robert W.; and Peters, Alan D., 4,928,757, Cl. 166-55.100.

Peters, Bruce R.: *See*—
Burger, Christian P.; Dudderar, Thomas D.; Gilbert, John A.; Peters, Bruce R.; and Smith, James A., 4,928,527, Cl. 73-657.000.

Peters, Josef: *See*—
Kalitzki, Siegfried; Peters, Josef; and Schurmann, Gottfried, 4,928,477, Cl. 57-416.000.

Peters, Petrus J.: *See*—
Noomen, Arie; and Peters, Petrus J., 4,929,661, Cl. 524-259.000.

Peters, Petrus J. M.: *See*—
Hoeberechts, Arthur M. E.; and Peters, Petrus J. M., 4,929,999, Cl. 357-68.000.

Peterson, Elmer R., to Baker Hughes Incorporated. Sump packer latching mechanism. 4,928,768, Cl. 166-380.000.

Peterson, Gerald E., to Toro Company, The. Apparatus for interconnecting components of a power outlet strip. 4,930,047, Cl. 361-395.000.

Peterson, Ronald E.: *See*—
Durand, William W.; and Peterson, Ronald E., 4,929,063, Cl. 350-353.000.

Petillo, John J., Sr. Combined inflatable headrest and storage device. 4,928,336, Cl. 5-441.000.

Pews, R. Garth, to Dow Chemical Company, The. Substituted oxirane compounds. 4,929,268, Cl. 71-88.000.

Pfeiffer, Bernhard, to Siemens Aktiengesellschaft. Current overload tripping device with leading tripping action. 4,930,038, Cl. 361-92.000.

Pfenning, Dwight B.: *See*—
Bradbury, Harold M.; Pfenning, Dwight B.; Corlett, William R.; and Mays, Roscoe, Jr., 4,929,818, Cl. 235-381.000.

Pfennings, Leonardus C. M. G., deceased: *See*—
Davies, Thomas J.; Seevinck, Evert; Pfennings, Leonardus C. M. G., deceased; Kennen, Henricus J.; Voss, Peter H.; O'Connell, Cormac M.; Phelan, Cathal G.; and Ontrop, Hans, 4,929,911, Cl. 330-264.000.

Pfizer Inc.: *See*—
Dutton, Christopher; and Perry, David, 4,929,638, Cl. 514-450.000.

Pfleger, Frederick W. Syringe construction. 4,929,230, Cl. 604-90.000.

Ph. Orth Co.: *See*—
Willyard, Marvin R.; and Lingg, Jean M., 4,929,464, Cl. 426-549.000.

Phelan, Cathal G.: *See*—
Davies, Thomas J.; Seevinck, Evert; Pfennings, Leonardus C. M. G., deceased; Kennen, Henricus J.; Voss, Peter H.; O'Connell, Cormac M.; Phelan, Cathal G.; and Ontrop, Hans, 4,929,911, Cl. 330-264.000.

Phelps, Richard A.: *See*—
Lorence, Brian S.; Phelps, Richard A.; and Grabowski, David N., 4,928,865, Cl. 224-275.000.
Phillip, Bradley L., to Enhanced Insulations, Inc. Thermally insulating window and method of forming. 4,928,448, Cl. 52-174.000.
Phillips, Edward H. Building panel module. 4,928,468, Cl. 52-574.000.
Phillips Petroleum Co.: *See*—
Clark, James B.; and Langley, Deborah E., 4,929,365, Cl. 210-754.000.
Cregg, James M.; and Barringer, Kevin J., 4,929,555, Cl. 435-172.300.
Lowery, Richard E.; Fu, Chia M.; and Maholland, Michael K., 4,929,336, Cl. 208-120.000.
Phillips, Ronald W., II, to B.F. Goodrich Company, The. Tubular connector. 4,929,001, Cl. 285-158.000.
Piaggio & C. S.p.A.: *See*—
Nuti, Marco, 4,928,555, Cl. 74-745.000.
Piatt, John A. Body surfboard with added flotation. 4,929,207, Cl. 441-65.000.
Piccardi, Paolo: *See*—
Massardo, Pietro; Bettarini, Franco; Piccardi, Paolo; and Rama, Franco, 4,929,772, Cl. 568-812.000.
Pichard, Jacques: *See*—
Guezou, Jean-Pierre; and Pichard, Jacques, 4,929,200, Cl. 440-38.000.
Picker International, Inc.: *See*—
Plut, Leonard F.; and Nicolay, David, 4,930,144, Cl. 378-99.000.
Pickering, John H.; Bhatia, Sushil K.; Rath, Mihira K.; and Chevrette, Roger N., to Dennison Manufacturing Company. Bindable cover folders. 4,928,995, Cl. 281-29.000.
Pillsbury Company, The: *See*—
Kanafani, Hanny; Patrick, Bruce M.; and Atwell, William A., 4,929,465, Cl. 426-552.000.
Pinder, Kenneth: *See*—
Lobley, Derek G.; and Pinder, Kenneth, 4,929,434, Cl. 423-479.000.
Pioneer Electronic Corporation: *See*—
Kato, Toshifumi, 4,928,787, Cl. 181-141.000.
Kunimaru, Noritaka; Shiba, Katsuhiro; Kudo, Norio; Inoshita, Gen; and Sato, Shogo, 4,930,028, Cl. 360-85.000.
Nagahara, Shinichi; Suzuki, Tomoyuki; Yamada, Tomoyasu; Takahashi, Tokihiro; and Miyake, Ichiro, 4,930,031, Cl. 360-107.000.
Tateishi, Kiyoshi, 4,930,114, Cl. 369-32.000.
Yokogawa, Fumihiko; and Naito, Ryuichi, 4,929,917, Cl. 331-1.00A.
Piorr, Robert: *See*—
Veitenhansl, Rudolf; Froeschke, Wolfgang; and Piorr, Robert, 4,929,504, Cl. 428-395.000.
Pissiotas, Georg: *See*—
Moser, Hans; Pissiotas, Georg; Brunner, Hans-Georg; Bohner, Beat; and Baumann, Marcus, 4,929,272, Cl. 71-95.000.
Pistoulet, Bernard: *See*—
Brun, Gerard; Marin-Ayral, Rose-Marie; Maurin, Maurice; Pistoulet, Bernard; and Tedenac, Jean-Claude, 4,929,282, Cl. 136-239.000.
Pitman, John C.: *See*—
Rye, Grover W.; and Pitman, John C., 4,928,741, Cl. 152-504.000.
Pitney Bowes Inc.: *See*—
Auerbach, David R., 4,928,807, Cl. 198-379.000.
Buan, Danilo P.; Abellana, Jovito N.; and Dolan, Donald T., 4,929,106, Cl. 400-649.000.
Ramsey, James S.; and Lorenzo, John L., 4,928,949, Cl. 271-111.000.
Pitre, Michael G. Artificial bait crab-like fishing lure. 4,928,422, Cl. 43-42.000.
Pitt, Donald R., to Vari-Prop, Inc. Variable pitch marine propeller system. 4,929,201, Cl. 440-50.000.
Planeta, Mirek. Air rings for production of blown plastic film. 4,929,162, Cl. 425-72.100.
Plastiflex Company International: *See*—
Finley, Richard O., 4,929,155, Cl. 417-53.000.
Pleschiutschnigg, Fritz-Peter; Moellers, Gerd; Eberhardt, Hans-Georg; Rahmfeld, Werner; Parschat, Lothar; and Ehrenberg, Hans-Juergen, to Mannesmann AG. Side wall geometry for molds for casting of thin slabs. 4,928,747, Cl. 164-418.000.
Pliura, Diana H.: *See*—
Castelhano, Arlindo L.; DeYoung, Lawrence M.; Krantz, Alexander; Pliura, Diana H.; and Venuti, Michael C., 4,929,630, Cl. 514-380.000.
PLM AB: *See*—
Jakobsen, Kjell M.; and Nilsson, Claes T., 4,929,168, Cl. 425-384.000.
Plockmatic International AB: *See*—
Soderberg, Terje; Sodersteen, Rolf; and Toreman, Ulrik, 4,928,945, Cl. 271-9.000.
Plog, Carsten: *See*—
Steinwandel, Juergen; Haas, Juergen; and Plog, Carsten, 4,929,581, Cl. 502-2.000.
Plotnick, Michael A.: *See*—
Cripps, Peter K.; and Plotnick, Michael A., 4,930,140, Cl. 375-1.000.
Plut, Leonard F.; and Nicolay, David, to Picker International, Inc. Radiation imaging monitor control improvement. 4,930,144, Cl. 378-99.000.
Poglitsch, Lawrence R., to Motorola Inc. Method for filling a cavity, such as a sensor cavity, with an incompressible fluid. 4,928,376, Cl. 29-530.000.
Pohl, Jorg: *See*—
Scheffler, Gerhard; Niemeyer, Ulf; Brock, Norbert; and Pohl, Jorg, 4,929,607, Cl. 514-110.000.
Poizner, Julius. Housing for automobile lamps. 4,930,050, Cl. 362-61.000.
Politte, Ron: *See*—
Moshier, Mark; and Politte, Ron, 4,928,592, Cl. 99-450.800.
Polizzotti, David M., to Betz Laboratories, Inc. Method of inhibiting fouling in protein-containing fluids. 4,929,361, Cl. 210-698.000.
Pollak, Robert R.; and Marcos, Juan A., to United Technologies Corporation. Control of high compressor vanes and fuel for a gas turbine engine. 4,928,482, Cl. 60-39.161.
Pollastrini, Sheila; Bricker, Jeffery C.; and Frame, Robert R., to UOP. Catalyst and process for sweetening a sour hydrocarbon fraction using dipolar compounds. 4,929,340, Cl. 208-189.000.
Polovoi, Sergei A.: *See*—
Dryga, Alexandr I.; Alexeev, Vyacheslav M.; and Polovoi, Sergei A., 4,928,554, Cl. 74-87.000.
Polyplastics Co., Ltd.: *See*—
Sugiyama, Noriyuki; and Mochizuki, Mitsuhiro, 4,929,712, Cl. 528-230.000.
Ponn, Timothy R.; Gutierrez, Mark; and Gugelmeyer, Robert J., to Molex Incorporated. Insert molded filter connector. 4,929,196, Cl. 439-620.000.
Ponticello, Gerald S.: *See*—
Baldwin, John J.; Ponticello, Gerald S.; and Habecker, Charles N., 4,929,637, Cl. 514-445.000.
Poon, Otto L. Lift. 4,928,796, Cl. 187-89.000.
Popovic, Radivoje, to LGZ Landis & Gyr Zug AG. Hall element device with depletion region protection barrier. 4,929,993, Cl. 357-27.000.
Porat, Chaim, to Magal Security Systems, Ltd. Intrusion detection barrier. 4,929,926, Cl. 340-541.000.
Portscheller, James I.: *See*—
Atkinson, Robert W.; Crayton, John W.; Portscheller, James I.; and Wood, Daniel C., 4,928,642, Cl. 123-180.00R.
Possani, Lourival D. P.; Gurrola, Georgina B.; Bayon, Marco A. A. C.; and Sitges, Maria B., to Universidad Nacional Autonoma De Mexico. Synthetic noxiustoxin related peptides. 4,929,718, Cl. 530-326.000.
Potter, Gary J.; Schlote, David S.; and Reinkemeyer, Robert W., to Cambridge Engineering, Inc. Direct gas fired industrial air heater burner. 4,929,541, Cl. 432-222.000.
Pourarian, Fiaz: *See*—
Wallace, W. Edward; Smith, H. Kevin; Lynch, W. Bryan; Craig, Raymond S.; and Pourarian, Fiaz, 4,928,496, Cl. 62-46.200.
Powell, Maxwell M., to Exovir, Inc. Compositions suitable for human topical application including a growth factor and/or related materials. 4,929,442, Cl. 424-85.200.
Powers, William J., III; Matthews, Leonard A.; and Jao, Tze-Chi, to Texaco Inc. Process for preparing overbased calcium sulfonates. 4,929,373, Cl. 252-33.000.
Powr-Ups Corporation: *See*—
Summer, Steven E., 4,929,873, Cl. 315-219.000.
PPG Industries, Inc.: *See*—
Kobashi, Rikizo; Takase, Shigeyuki; Enomoto, Hiroyuki; Hayasaki, Yasushi; Kobayashi, Toyohisa; and Yamazaki, Shingo, 4,929,685, Cl. 525-277.000.
Prada, Marco: *See*—
Brunetti, Brunetto; and Prada, Marco, 4,929,601, Cl. 514-18.000.
Precision Devices Inc.: *See*—
Fitts, Frederick L., 4,928,517, Cl. 73-105.000.
Precision Monolithics, Inc.: *See*—
Morton, William D., Jr., 4,928,934, Cl. 206-328.000.
Premier Refractories & Chemicals Inc.: *See*—
Lassiter, Perry B., 4,929,579, Cl. 501-133.000.
Prestjohn, Mark O.: *See*—
Cunningham, John A.; Prestjohn, Mark O.; Reed, Bobby P.; and Smith, Martin D., 4,929,976, Cl. 354-322.000.
Price, John G.: *See*—
Fillmore, Danielle M.; Price, John G.; and Swihart, Terence J., 4,929,691, Cl. 525-477.000.
Prince: *See*—
Clark, Robert J.; and Binish, Patrick W., 4,929,014, Cl. 296-97.800.
Prince, Stephen R.: *See*—
Sudolnik, James M.; and Prince, Stephen R., 4,928,733, Cl. 137-630.130.
Prindle, William A., to Robinson Knife Manufacturing Co., Inc. Food processor. 4,928,893, Cl. 241-95.000.
Prisco, Michael R.: *See*—
Desecki, Vince C.; and Prisco, Michael R., 4,929,242, Cl. 604-266.000.
Process Technology Inc.: *See*—
Rezabek, Dennis J., 4,929,930, Cl. 340-622.000.
Procter & Gamble Company, The: *See*—
Meyer, Eric W.; and Van Coney, Robert H., 4,929,410, Cl. 264-533.000.
Production Data, Inc.: *See*—
Tonnelli, Gerald J., 4,928,522, Cl. 73-155.000.
Progressive Dynamics, Inc.: *See*—
Stephenson, James G.; and Huggett, Mark D., 4,930,056, Cl. 362-364.000.

Promislow, Albert L.: *See*—
Anderson, Norman S.; Promislow, Albert L.; Rayborn, Randy L.; and Vukov, Rastko, 4,929,769, Cl. 568-614.000.

Prugh, John D.: *See*—
Hartman, George D.; and Prugh, John D., 4,929,549, Cl. 514-227.800.

Prus, Eric; Frene, Andre ; Bordaz, Pascal; Guerange, Patrick; and Thome, Caryl, to Sames S.A. Pumped coating product spraying installation. 4,928,880, Cl. 239-8.000.

PruTech II: *See*—
Joshi, Narendra D.; and Moreno, Frederick E., 4,928,481, Cl. 60-737.000.

Pryor, Michael J.; Fister, Julius C.; Singhdeo, Narendra N.; Mahulikar, Deepak; and Cherukuri, Satyam C., to Olin Corporation. Semiconductor die attach system. 4,929,516, Cl. 428-620.000.

Pucci, Michael J.: *See*—
Vandenbergh, Peter A.; Pucci, Michael J.; Kunka, Blair S.; and Vedamuthu, Ebenezer R., 4,929,445, Cl. 424-115.000.

Pulsifer, David N.: *See*—
Hagerty, James J.; and Pulsifer, David N., 4,929,065, Cl. 350-413.000.

Purethane Incorporated: *See*—
Lilienthal, Cal A.; and Christensen, Ronald L., 4,929,017, Cl. 296-153.000.

Pyramid, Inc.: *See*—
Smith, Thomas R.; and Tripp, Thomas M., 4,929,222, Cl. 474-255.000.

Quantum Chemical Corporation: *See*—
Chang, Biau-Hung; Lee, Lester Y.; and Kwiatek, Jack, 4,929,711, Cl. 528-220.000.

Quegan, Shaun: *See*—
Freeman, Anthony; Blacknell, David; Quegan, Shaun; Ward, Ian A.; Oliver, Christopher J.; Finley, Ian P.; White, Richard G.; and Wood, James W., 4,929,950, Cl. 342-25.000.

Quenzer, Michael: *See*—
Schult, Klaus; Kister, Horst; and Quenzer, Michael, 4,928,531, Cl. 73-855.000.

Quiring, Bernd: *See*—
Nouvertne, Werner; Gielen, Franz-Josef; Tacke, Peter; Grigo, Ulrich; Quiring, Bernd; and Lindner, Christian, 4,929,674, Cl. 325-66.000.

Quittner, Erik: *See*—
Vandersluis, Ron; and Quittner, Erik, 4,929,009, Cl. 294-2.000.
Vandersluis, Ron; and Quittner, Erik, 4,929,011, Cl. 294-86.400.

Qume Corporation: *See*—
Graham, Scott M.; Ewing, Kenneth R.; Trackman, Marshall H.; and Darr, Duane R., 4,929,099, Cl. 400-76.000.

Qureshy, Asif: *See*—
Buth, C. Eugene; Qureshy, Asif; Ross, Hayes E., Jr.; and Sicking, Dean L., 4,928,928, Cl. 256-13.100.

Qvint, Peter; Andersson, Tommy; and Eksell, Lennart, to General Engineering (Netherlands) B.V. Seat belt buckle arrangement. 4,928,992, Cl. 280-801.000.

R. Guthrie Research Associates Inc.: *See*—
Guthrie, Roderick I. L.; and Herbertson, Joseph G., 4,928,748, Cl. 164-479.000.

R. H. Murphy Company, Inc.: *See*—
Murphy, Robert H.; and Gosselin, Roland, 4,928,820, Cl. 206-328.000.

R. J. Reynolds Tobacco Company: *See*—
Shannon, Michael D., 4,928,714, Cl. 131-359.000.

Rabinkin, Anatol, to Allied-Signal Inc. Method of brazing employing bag-group homogeneous microcrystalline brazing powders. 4,928,872, Cl. 228-203.000.

Rackwitz, Guenter: *See*—
Landwehr, Ulrich M.; and Rackwitz, Guenter, 4,928,708, Cl. 128-774.000.

Raddatz, Siegfried: *See*—
Mohrs, Klaus; Raddatz, Siegfried; Fruchtmann, Romanis; Kohlsdorfer, Christian; and Muller-Peddinghaus, Reiner, 4,929,626, Cl. 514-311.000.

Radziewicz, Edmund. Anti-theft locking valve for motor vehicles. 4,928,506, Cl. 70-176.000.

Ragnegård, Samuel; and Sjoberg, Arne, to AB Hedemora Verkstader. Method and apparatus for the separation of caustic liquor, lime sludge and sludge in a causticizing process. 4,929,355, Cl. 210-784.000.

Rahmfeld, Werner: *See*—
Pleschiutschnigg, Fritz-Peter; Moellers, Gerd; Eberhardt, Hans-Georg; Rahmfeld, Werner; Parschat, Lothar; and Ehrenberg, Hans-Juergen, 4,928,747, Cl. 164-418.000.

Rainbarrel Corporation: *See*—
Bradbury, Harold M.; Pfenning, Dwight B.; Corlett, William R.; and Mays, Roscoe, Jr., 4,929,818, Cl. 235-381.000.

Rajagopalan, Parthasarathi: *See*—
Pennev, Penio; Rajagopalan, Parthasarathi; and Scribner, Richard M., 4,929,627, Cl. 514-320.000.

Raleigh, Freddie L., to Warner & Swasey Company, The. Coordinate measuring machine with improved carriage drive system. 4,928,396, Cl. 33-503.000.

Ralph McKay Limited: *See*—
Young, Hartley F., 4,928,878, Cl. 238-351.000.

Rama, Franco: *See*—
Massardo, Pietro; Bettarini, Franco; Piccardi, Paolo; and Rama, Franco, 4,929,772, Cl. 568-812.000.

Rambeck, Walter A.: *See*—
Meier, Werner; Rambeck, Walter A.; Weiser, Harald; and Zucker, Hermann, 4,929,610, Cl. 514-167.000.

Ramex Syn-Fuels International: *See*—
Nielson, Donald H., 4,928,765, Cl. 166-251.000.

Ramos, Rolando P.; Loreto, Wilfredo P.; and Vulich, Yordan, to AIT Industries, Inc. Lens edging machine and method. 4,928,439, Cl. 51-284.00E.

Ramsey, James S.; and Lorenzo, John L., to Pitney Bowes Inc. Low paper indicator. 4,928,949, Cl. 271-111.000.

Ramsey, John A. Dispenser apparatus for beverage bottles. 4,928,855, Cl. 222-131.000.

Rapid Mounting & Finishing Company: *See*—
Rutchik, Robert K., 4,928,413, Cl. 40-511.000.

Rasch, Kenneth R.: *See*—
Barton, Arthur A.; DeBolt, Frederick C.; Elter, Michael R.; Fromm, Paul M.; Grossi, Frank A.; Miller, Mark T.; Rasch, Kenneth R.; and Szlucha, Thomas F., 4,929,983, Cl. 355-315.000.

Rasmussen GmbH: *See*—
Sauer, Heinz, 4,929,002, Cl. 285-319.000.

Rasmussen, Lyle S. Position-adjusting apparatus for mounting a reclining chair on a pedestal base. 4,929,023, Cl. 297-330.000.

Rast, Howard E., Jr.: *See*—
DiVita, Sam; and Rast, Howard E., Jr., 4,929,837, Cl. 250-461.100.

Rath, Mihira K.: *See*—
Pickering, John H.; Bhatia, Sushil K.; Rath, Mihira K.; and Chevrette, Roger N., 4,928,995, Cl. 281-29.000.

Ratti, Giuseppina: *See*—
Colle, Roberto; Camaggi, Giovanni; Gozzo, Franco; Ratti, Giuseppina; Garavaglia, Carlo; and Mirenna, Luigi, 4,929,631, Cl. 514-383.000.

Raubenheimer, Hans-Juergen: *See*—
Goertz, Hans-Helmut; Denzinger, Walter; and Raubenheimer, Hans-Juergen, 4,929,690, Cl. 525-366.000.

Ravichandran, Ramanathan, to Ciba-Geigy Corporation. Substituted aminoxy-propionamides. 4,929,657, Cl. 524-196.000.

Ravichandran, Ramanathan, to Ciba-Geigy Corporation. Substituted aminoxyethyl sulfoxides and sulfones. 4,929,659, Cl. 524-155.000.

Ray, Andrew M.: *See*—
Dykstra, Jerald P.; and Ray, Andrew M., 4,929,840, Cl. 250-492.300.

Rayborn, Randy L.: *See*—
Anderson, Norman S.; Promislow, Albert L.; Rayborn, Randy L.; and Vukov, Rastko, 4,929,769, Cl. 568-614.000.

Rayhack, John M. Bone compression and distraction device. 4,929,247, Cl. 606-53.000.

Raytheon Company: *See*—
Viana, Luis M.; Cuozzo, Robert A.; Miceli, Michael L.; and Whitney, Kent A., 4,930,035, Cl. 361-54.000.

RCA Licensing Corporation: *See*—
Leonardi, Giovanni M., 4,930,060, Cl. 363-21.000.

Reaction Thermal Systems, Inc.: *See*—
Gilbertson, Thomas A.; Meyers, Michael R.; and Kinneberg, Bruce, 4,928,493, Cl. 62-185.000.

Reardon, Patricia A.; and Grattan, David A., to Nalco Chemical Company. Amine/gallic acid blends as oxygen scavengers. 4,929,364, Cl. 210-750.000.

Recker, Hans-Gert: *See*—
Smuda, Hubert; Hoelderich, Wolfgang; Goetz, Norbert; and Recker, Hans-Gert, 4,929,765, Cl. 568-427.000.

Reddy, Vaddi B., to GTE Products Corporation. Process for improving the luminescence of niobium activated yttrium tantalate X-ray phosphor. 4,929,384, Cl. 252-301.40R.

Reddy, Vaddi B., to GTE Products Corporation. Freon free process for preparing a niobium activated yttrium tantalate X-ray phosphor. 4,929,385, Cl. 252-301.40R.

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Redmon, Charles L.: *See*—
Boghean, Barry J.; Subbanna, Somanahalli N.; Redmon, Charles L.; and Wamser, Christian A., 4,929,435, Cl. 423-484.000.

Redpath, James; Logan, Robert T.; McFadzen, David B.; and Roy, Robert G., to Akzo N.V. Positive inotrophic benzothiazole and benzothiophene compositions and method of use therefor. 4,929,636, Cl. 514-443.000.

Reed, Bobby P.: *See*—
Cunningham, John A.; Prestjohn, Mark O.; Reed, Bobby P.; and Smith, Martin D., 4,929,976, Cl. 354-322.000.

Reed, Scott T.: *See*—
Ashley, Carol S.; and Reed, Scott T., 4,929,278, Cl. 106-287.120.

Regie Nationale des Usines Renault: *See*—
Lecocq, Jean-Luc, 4,929,941, Cl. 340-825.140.

Rehrer, Wilson P.: *See*—
Wegman, Dwight D.; Wanner, Edward A.; Rehrer, Wilson P.; and Widge, Sunil, 4,929,419, Cl. 420-56.000.

Reichelt, Helmut: *See*—
Hansen, Guenter; Schefczik, Ernst; and Reichelt, Helmut, 4,929,720, Cl. 534-766.000.

Reichenberger, Helmut; and Naser, Georg, to Siemens Aktiengesellschaft. Shock wave generator for generating an acoustical shock wave pulse. 4,928,671, Cl. 128-24.00A.

Reichenberger, Helmut: *See*—
Grasser, Franz; Reichenberger, Helmut; Hassler, Dietrich; Naser, Georg; and Schmidt, Erhard, 4,928,672, Cl. 128-24.00A.

Reigstad, Gordon H.; Breivik, A. Norris; and Reigstad, Hanley S., to Tech Research, Inc. Anchor apparatus for a tendon in prestressed concrete slab. 4,928,451, Cl. 52-223.00L.

Reigstad, Hanley S.: *See*—
Reigstad, Gordon H.; Breivik, A. Norris; and Reigstad, Hanley S., 4,928,451, Cl. 52-223.00L.

Reiko Co., Ltd.: *See*—
Horii, Shigeo, 4,928,908, Cl. 244-31.000.

Reilly, Shirley L., to Auto-trol Technology Corporation. Polygon display apparatus and method. 4,930,092, Cl. 364-522.000.

Reinartz, Hans-Dieter; and Steffes, Helmut, to Alfred Teves GmbH. Hydraulic unit. 4,929,038, Cl. 303-119.000.

Reinecke, Paul: *See*—
Jelich, Klaus; Brandes, Wilhelm; Hanssler, Gerd; and Reinecke, Paul, 4,929,738, Cl. 549-76.000.

Reiner, David: *See*—
Zinn, Ben T.; and Reiner, David, 4,929,172, Cl. 431-1.000.

Reinkemeyer, Robert W.: *See*—
Potter, Gary J.; Schlote, David S.; and Reinkemeyer, Robert W., 4,929,541, Cl. 432-222.000.

Reisener, Delbert C.; and Pearson, Dennis G., to Deublin Company. Rotating union with carbon graphite labyrinthine seal. 4,928,997, Cl. 285-13.000.

Reiser, Wolf; and Feyen, Peter, to Bayer Aktiengesellschaft. Process for the preparation of oxiranes. 4,929,735, Cl. 548-268.800.

Reist, Walter, to Ferag AG. Mobile storage unit for processing printed products, such as newspapers, periodicals and the like. 4,928,899, Cl. 242-59.000.

Reiton Corporation: *See*—
Macaione, Anthony F.; and Wright, John V., 4,930,134, Cl. 372-33.000.

Reliance Electric Company: *See*—
Maloney, Joseph J., 4,928,795, Cl. 184-7.400.

Rembaum, Alan; Rhim, Won-Kyu; Hyson, Michael T.; and Chang, Manchium, to California Institute of Technology. Production of monodisperse, polymeric microspheres. 4,929,400, Cl. 264-10.000.

Remote Automation & Control Electronics Inc.: *See*—
Tin, Joshua K., 4,928,778, Cl. 180-167.000.

Renault Vehicules Industriels: *See*—
Miettaux, Marc, 4,928,887, Cl. 239-584.000.

Renger, Herman L.: *See*—
Bell, Robert L.; and Renger, Herman L., 4,929,890, Cl. 324-78.00R.

Research and Development Institute, Inc. at Montana State University: *See*—
Cardellina, John H., II; Stierle, Andrea C.; and Strobel, Gary A., 4,929,270, Cl. 71-92.000.

Resnick, Susan D.; and Nuyens, Angela M., to Softspot, Inc. Hand held tactile toy. 4,929,211, Cl. 446-14.000.

Reusch, Frederick J., Sr., to Reusch, Frederick J., Sr.; Reusch, J., Jr.; and Reusch, Paul R., Sr. Fireplace damper indicator. 4,928,668, Cl. 126-537.000.

Reusch, J., Jr.: *See*—
Reusch, Frederick J., Sr., 4,928,668, Cl. 126-537.000.

Reusch, Paul R., Sr.: *See*—
Reusch, Frederick J., Sr., 4,928,668, Cl. 126-537.000.

Rezabek, Dennis J., to Process Technology Inc. Liquid level controller utilizing the rate of change of a thermocouple. 4,929,930, Cl. 340-622.000.

Rheinmetall GmbH: *See*—
Sabranski, Udo; Luther, Hans W.; Sabinski, Horst; and Winkelmann, Jurgen, 4,928,598, Cl. 102-467.000.

Rheox, Inc.: *See*—
Guilbeaux, Ronald D., 4,929,644, Cl. 514-642.000.

Rhim, Won-Kyu: *See*—
Rembaum, Alan; Rhim, Won-Kyu; Hyson, Michael T.; and Chang, Manchium, 4,929,400, Cl. 264-10.000.

Rhodes, Michael L. P., to AE PLC. Pistons with bearing members. 4,928,578, Cl. 92-187.000.

Rhone-Poulenc Chimie: *See*—
Cavezzan, Jacques; Frances, Jean-Marc; and Lancelin, Pierre, 4,929,702, Cl. 528-18.000.
Hogenmuller, Roger; Chauvel, Bernard; and Daniel, Jean-Claude, 4,929,662, Cl. 524-376.000.
Iltis, Alain; and Maestro, Patrick, 4,929,574, Cl. 501-137.000.

Rhone-Poulenc Sante: *See*—
Grosselin, Jean-Michel; and Mercier, Claude, 4,929,776, Cl. 568-862.000.

Rhone-Poulenc Specialites Chimiques: *See*—
Lagarde, Robert; Ariagno, Daniel; and Nys, Jacques, 4,929,460, Cl. 426-420.000.

Ribich, William A.: *See*—
Smirlock, Martin E.; Ribich, William A.; Marinaccio, Paul J.; and Sawaf, Bernard E., 4,928,575, Cl. 89-36.020.

Ricco, Mario, to Weber S.r.l. Fast solenoid valve, particularly a fuel injection pilot valve for diesel engines. 4,928,888, Cl. 239-533.800.

Rice, Roy W.: *See*—
Berneburg, Philip L.; and Rice, Roy W., 4,928,645, Cl. 123-188.0AA.

Rice, Wayne K., to Rice, Wayne K. Apparatus for carrying out extractions in subterranean well. 4,929,348, Cl. 210-109.000.

Richards, Toby D.; and Antonio, Anthony I., Jr., to Fabricated Plastics, Inc. Reinforced strip and flexible hoses produced therewith. 4,928,734, Cl. 138-154.000.

Richards, Toby D.; and Antonio, Anthony I., Jr., to Fabricated Plastics, Inc. Reinforced strip and flexible hoses produced therewith. 4,928,735, Cl. 138-154.000.

Richardson, Larie; and Steingold, Harold. Crushing apparatus having a fluid supply means associated with a rotary crusher. 4,928,891, Cl. 247-41.000.

Richardson, Neil G.: *See*—
Findlay, David M., deceased; and Richardson, Neil G., 4,929,454, Cl. 424-638.000.

Richartz, Adolf: *See*—
Scholl, Thomas; Jabs, Gert; and Richartz, Adolf, 4,929,710, Cl. 528-205.000.

Richter, Horst: *See*—
Dislich, Heinz; and Richter, Horst, 4,928,931, Cl. 266-45.000.

Ricoh Company, Ltd.: *See*—
Kurokawa, Shunji, 4,930,155, Cl. 379-354.000.
Maruta, Keiichi; Ueda, Takashi; and Watanabe, Yasuhiko, 4,929,590, Cl. 503-207.000.

Rieter Machine Works, Ltd.: *See*—
Clement, Heinz, 4,928,357, Cl. 19-225.000.

Rife, Conwell K., Jr.: *See*—
Lent, Kevin C.; Rife, Conwell K., Jr.; Simmons, Gerald P.; and Speck, Albert J., 4,929,121, Cl. 404-84.000.

Riffe, Delmar R., to American Standard Inc. Scroll apparatus with pressure regulation. 4,928,503, Cl. 62-498.000.

Right, Robert W.: *See*—
Buyak, William P.; Testa, Bruce V.; and Right, Robert W., 4,929,924, Cl. 340-384.00E.

Rin, Seiten: *See*—
Kitazume, Tomoya; Yamazaki, Takashi; and Rin, Seiten, 4,929,760, Cl. 568-308.000.

Rinneburger, Klaus P. K., to U.S. Philips Corporation. Device for electrically interconnecting electrical and/or electromechanical assemblies, method of electrically interconnecting such assemblies, and apparatus manufactured in accordance with the method. 4,929,183, Cl. 439-67.000.

Rippl, Carl G.: *See*—
Midkiff, David G.; Rippl, Carl G.; Twyman, Nancy D.; and Wahlquist, Joseph D., 4,929,480, Cl. 428-35.600.

Risley, Michael S., to Cornell Research Foundation, Inc. In vitro screening test for mutagenicity and genotoxicity during spermatogenesis. 4,929,542, Cl. 435-2.000.

Rittenhouse, David A.; Neurohr, Fred; and Estridge, Doug R., to James River Corporation. Method of making decorative cast-coated paper. 4,929,470, Cl. 427-55.000.

RIV-SKF Officine di Villar Perosa S.p.A.: *See*—
Colanzi, Franco; and Vignotto, Angelo, 4,928,371, Cl. 29-898.064.

Rivers, Donald E., Jr.: *See*—
Diebolt, Richard A.; Kidd, Stephen; and Rivers, Donald E., Jr., 4,929,130, Cl. 409-136.000.

RJS Corporation: *See*—
Slezak, Raymond J., 4,929,012, Cl. 294-86.410.

Robert Bosch GmbH: *See*—
Braschel, Volker; and Seitz, Dieter, 4,929,034, Cl. 303-103.000.
Sohner, Gerhard; Roth, Helmut; Brammer, Hartmut; Schleupen, Richard; and Nubel, Karl-Heinz, 4,928,660, Cl. 123-647.000.

Robertson, Allan J.; and Gallivan, James B., to Cyanamid Canada Inc. 1,4-Disubstituted-2,3,5,6-tetrahydroxy-1,4-diphosphorinanes and their oxides or sulfides. 4,929,393, Cl. 252-609.000.

Robine, Alain: *See*—
Cameron, Charles; Mimoun, Hubert; Bonnaudet, Serge; and Robine, Alain, 4,929,787, Cl. 585-500.000.

Robinson Knife Manufacturing Co., Inc.: *See*—
Prindle, William A., 4,928,893, Cl. 241-95.000.

Robinson, William P.: *See*—
Parker, Norman W.; and Robinson, William P., 4,929,839, Cl. 250-492.300.

Robishaw, Alces P.; and Robishaw, Paul A., to Robishaw Engineering, Inc. Construction transporation system. 4,928,616, Cl. 114-267.000.

Robishaw Engineering, Inc.: *See*—
Robishaw, Alces P.; and Robishaw, Paul A., 4,928,616, Cl. 114-267.000.

Robishaw, Paul A.: *See*—
Robishaw, Alces P.; and Robishaw, Paul A., 4,928,616, Cl. 114-267.000.

Robitaille, James M.; and Wilson, Robert W., to Minnesota Mining and Manufacturing Company. Electrical outlet monitor. 4,929,887, Cl. 324-66.000.

Robles, Antonio: *See*—
Marquez, Edmundo M.; Nowak, Jean-Francois; and Robles, Antonio, 4,929,473, Cl. 427-252.000.

Rockwell International Corp.: *See*—
Mather, John C.; and Young, Jerald A., 4,928,387, Cl. 29-840.000.

Rodgers, Colin: *See*—
Shekleton, Jack R.; Rodgers, Colin; and Archibald, John P., 4,928,479, Cl. 60-39.360.

Rodowsky, Stanley J., Jr.: *See*—
Elson, Donald E.; Gerke, Burton E., Jr.; Bitzel, Michael E.; Wilder, Bruce A.; Rodowsky, Stanley J., Jr.; Lessig, William R., III; Adams, Jeffrey S.; and Hagan, Todd A., 4,928,346, Cl. 15-338.000.

Roeser, John O.; and Graham, Bruce L., to Otto Engineering, Inc. Electrical switch component and switches formed thereby. 4,929,808, Cl. 200-467.000.

Roessler, Dennis E., to Halliburton Logging Services, Inc. Wireline tool cable head overload apparatus. 4,928,764, Cl. 166-250.000.

Rogers, Melvin F.: *See*—
Dougherty, Lawrence W.; Lee, Sae D.; and Rogers, Melvin F., 4,930,015, Cl. 358-246.000.

Rogler, Wolfgang; Weitemeyer, Christian; Wewers, Dietmar; Zapf, Frederic; and Stapp, Bernhard, to Siemens Aktiengesellschaft. Optical glass fiber with a primary coating of organo-polysiloxanes containing acrylic acid ester groups. 4,929,051, Cl. 350-96.300.

Rohrer, Paul: *See*—
Halç, Paul; and Rohrer, Paul, 4,929,483, Cl. 428-47.000.

Roland, Charles M.; Bohm, Georg G. A.; and Schonfeld, Steven E., to Bridgestone/Firestone, Inc. Stiff sidewalls for pneumatic tires. 4,929,684, Cl. 525-274.000.

Roling, Paul V., to Betz Laboratories, Inc. Methods and compositions for inhibiting styrene polymerization. 4,929,778, Cl. 585-3.000.

Rolland, Jean-Jacques: *See*—
Chagneau, Francis; Levasseur, Michel; Landanger, Patrick; Langlais, Frantz; and Rolland, Jean-Jacques, 4,928,679, Cl. 606-62.000.

Romagnoli, Andrea, to Cestind - Centro Studi Industriali-S.R.L. Sealing device with multiple differential action for machines producing dual-use filter sachets for infusion products. 4,929,299, Cl. 156-466.000.

Roman, Francois J.: *See*—
Calvet, Alain P.; Junien, Jean-Louis; Pascal, Ives R.; Pascaud, Xavier B.; and Roman, Francois J., 4,929,614, Cl. 514-214.000.

Roman Shoji Co., Ltd.: *See*—
Nakamura, Keizi, 4,928,403, Cl. 36-34.00A.

Romer, Eike, to Dipl.-Ing. Wrede & Niedecken Verwaltung GmbH. Leakage control mechanism. 4,929,929, Cl. 340-613.000.

Romer, Michael: *See*—
Mahlkow, Hartmut; Romer, Michael; Rosskamp, Gunther; Seidenspinner, Hubert-Matthias; Stein, Ludwig; and Strache, Waltraud, 4,929,422, Cl. 427-57.000.

Rondot, Klaus; and Schlichting, Jorg, to Minnesota Mining & Manufacturing Comp. Pad enclosure. 4,928,814, Cl. 206-215.000.

Rooney, James F.; and Cheskis, Harvey P., to Olin Corporation. Die set for the formation of cavities for metal packages to house electronic devices. 4,928,512, Cl. 72-404.000.

Rooperal (NA) NV: *See*—
Pegel, Karl H.; and Walker, Hans, 4,929,603, Cl. 514-26.000.

Rorison, Allen H.: *See*—
Wiley, Patrick C.; and Rorison, Allen H., 4,929,120, Cl. 404-77.000.

Rosaen, Nils O. Oil mist sensor. 4,928,515, Cl. 73-61.00R.

Rose, Eric; and Dresdale, Arthur, to Columbia University in the City of New York, The Trustees of. Method of preparing a cryoprecipitated suspension and use thereof. 4,928,603, Cl. 106-124.000.

Rose, Robert C.: *See*—
Seiler, [illegible]ry D.; Pappas, James L.; and Rose, Robert C., 4,929,889, Cl. 371-22.300.

Rosestar* Incorporated: *See*—
Campanelli, Anthony S.; and Matre, Daniel A., 4,928,424, Cl. 47-1.010.

Ross, Hayes E., Jr.: *See*—
Buth, C. Eugene; Qureshy, Asif; Ross, Hayes E., Jr.; and Sicking, Dean L., 4,928,928, Cl. 256-13.100.

Ross, Leo R. Clamping device. 4,928,938, Cl. 269-261.000.

Rossio, Charles E.; and Koziol, Wladyslaw W., to Diversey Corporation. Conveyor lubricant containing alkyl amine coupling agents. 4,929,375, Cl. 252-49.300.

Rosskamp, Gunther: *See*—
Mahlkow, Hartmut; Romer, Michael; Rosskamp, Gunther; Seidenspinner, Hubert-Matthias; Stein, Ludwig; and Strache, Waltraud, 4,929,422, Cl. 427-57.000.

Roth, Bruce D.: *See*—
Chucholowski, Alexander W.; Roth, Bruce D.; and Sliskovic, Drago R., 4,929,620, Cl. 514-269.000.

Roth, Helmut: *See*—
Sohner, Gerhard; Roth, Helmut; Brammer, Hartmut; Schleupen, Richard; and Nubel, Karl-Heinz, 4,928,660, Cl. 123-647.000.

Roth, Nathan; and Yum, Su I., to ALZA Corporation. Implantable fluid imbibing pump with improved closure. 4,929,233, Cl. 604-131.000.

Rothman, Ulf S.: *See*—
Lindblom, Ragnvald E.; and Rothman, Ulf S., 4,929,443, Cl. 424-85.500.

Rotolico, Anthony J., to Perkin-Elmer Corporation, The. Wire and power thermal spray gun. 4,928,879, Cl. 239-8.000.

Roussillon, Samia: *See*—
Coquelet, Claude; Roussillon, Samia; Sincholle, Daniel; Bonne, Claude; and Alazet, Alain, 4,929,635, Cl. 514-438.000.

Roux, Jean Pierre: *See*—
Esterlin, Jacques; Le Parquier, Guy; and Roux, Jean Pierre, 4,928,570, Cl. 89-6.500.

Rovensky, Franz: *See*—
Binder, Dieter; and Rovensky, Franz, 4,929,616, Cl. 514-253.000.

Roy, Robert G.: *See*—
Redpath, James; Logan, Robert T.; McFadzen, David B.; and Roy, Robert G., 4,929,636, Cl. 514-443.000.

Royce Medical Company: *See*—
Grim, Tracy E., 4,928,678, Cl. 128-90.000.

Rubenstein, Mark S.: *See*—
Hollander, David S.; and Rubenstein, Mark S., 4,928,847, Cl. 220-408.000.

Rubie's Costume Co: *See*—
Beige, Joel, 4,930,052, Cl. 362-104.000.

Ruckenstein, Eli; and Chung, Dennis B., to State University of New York. Biocompatible polymer articles. 4,929,510, Cl. 428-520.000.

Rucki, Siegfried, to Schablonentechnik Kufstein GmbH. Tensioning roller, and device provided with such a tensioning roller. 4,928,593, Cl. 101-389.100.

Rudolf, William B. Retractable steering device for cargo barges that increases maneuverability by providing a pivot point or points when altering course. 4,928,613, Cl. 114-26.000.

Rueb, John T.: *See*—
Deziel, Edward W.; Rueb, John T.; Sorlien, Mark D.; Dahlstrom, Jack A.; and Erismann, David W., 4,929,029, Cl. 300-21.000.

Rueff, Herbert: *See*—
Aiuola, Franco; and Rueff, Herbert, 4,928,942, Cl. 210-58.000.

Ruhrkohle AG: *See*—
Breidenbach, Dieter; Oldengott, Hans; and Vitt, Burckard, 4,929,179, Cl. 432-247.000.

Ruitenburg, Leonardus J. M., to U.S. Philips Corporation. Synchronous demodulation circuit for a carrier-modulated television signal. 4,929,905, Cl. 329-358.000.

Rullier, Pierre, to Salomon S.A. Freely slidable antifriction plate which automatically recenters for safety binding. 4,928,990, Cl. 280-625.000.

Russell, David F.: *See*—
Watson, John C.; Gaskill, Stephen P.; Russell, David F.; and Burns, Robert L. D., 4,928,798, Cl. 188-218.0XL.

Russial, Joseph F.: *See*—
Heilman, Martin S.; Brandt, Arlan J.; Bowling, Larry D.; and Russial, Joseph F., 4,928,690, Cl. 128-421.000.

Rutchik, Robert K., to Rapid Mounting & Finishing Company. Display device. 4,928,413, Cl. 40-511.000.

Rutledge, F. Wayne. Panel system for windows. 4,928,450, Cl. 52-202.000.

Rutt, Winfried P. Switched-mode DC-to-DC power converter. 4,930,059, Cl. 363-20.000.

RXS Schrumpftechnik-Garnituren GmbH, Firma: *See*—
Will, Horst, 4,929,477, Cl. 428-34.900.

Ryan, Debra A., to Hoechst Celanese Corporation. Method of producing 1-(4'-isobutylphenyl)ethanol. 4,929,773, Cl. 568-814.000.

Rydell, Mark A.: *See*—
Goodin, Richard L.; Rydell, Mark A.; and Shockey, Rick L., 4,928,693, Cl. 128-637.000.

Rye, Grover W.; and Pitman, John C., to Goodyear Tire & Rubber Company, The. Rubber tire having polyvinylidene chloride/elastomer inner liner coating. 4,928,741, Cl. 152-504.000.

Rys, Paul: *See*—
Clausen, Martin; Rys, Paul; and Junkuan, Wang, 4,929,771, Cl. 568-798.000.

Rysavy, Peter B.; and Fuller, Maurice J., to John Fluke Mfg. Co., Inc. Apparatus for aligning raster scanned image to touch panel. 4,929,935, Cl. 340-712.000.

Saab-Scania Aktiebolag: *See*—
Elfverson, Sven E., 4,928,582, Cl. 98-2.000.

Saarmets, Alfred: *See*—
Manoury, Philippe; and Saarmets, Alfred, 4,929,621, Cl. 514-275.000.

Sabadics, Joseph L.: *See*—
Moorman, Charles T.; Sabadics, Joseph L.; and Bruscino, Joseph A., 4,929,462, Cl. 426-478.000.

Saber, Paik: *See*—
Chung, Paul W.; Gee, Ralph L.; Lang, Luke C. K.; and Saber, Paik, 4,929,918, Cl. 331-10.000.

Sabin, Jeffrey J., to Medical College of Ohio. Exercise device. 4,928,958, Cl. 272-96.000.

Sabinski, Horst: *See*—
Sabranski, Udo; Luther, Hans W.; Sabinski, Horst; and Winkelmann, Jurgen, 4,928,598, Cl. 102-467.000.

Sabranski, Udo; Luther, Hans W.; Sabinski, Horst; and Winkelmann, Jurgen, to Rheinmetall GmbH. Propelling charge case. 4,928,598, Cl. 102-467.000.

Sacco, Gasper J.: *See*—
Greenspan, Jacob; and Sacco, Gasper J., 4,928,368, Cl. 29-1.220.

Sacks, Charles H. Building structure. 4,928,452, Cl. 52-236.300.

Saeki, Keiso; and Endo, Tosiaki, to Fuji Photo Film Co., Ltd. Light image forming material and image-recording method using such. 4,929,530, Cl. 430-138.000.

Saft, Helmut, to Metallgesellschaft AG. Apparatus for deodorizing organic liquids. 4,929,310, Cl. 202-158.000.

Saft, Helmut, to Metallgesellschaft Aktiengesellschaft. Apparatus for deodorizing an organic liquid. 4,929,311, Cl. 202-158.000.

Sager, Thomas C.: *See*—
Holcombe, Thomas C.; Sager, Thomas C.; Volles, Warren K.; and Zarchy, Andrew S., 4,929,799, Cl. 585-737.000.

Sagiyama, Masari: *See*—
Watanabe, Tsutomu; Sagiyama, Masari; Kawabe, Masaki; Tsujihara, Toshiyuki; and Takushima, Shigehiro, 4,929,323, Cl. 204-206.000.

Sagiyama, Masaru: *See*—
Watanabe, Tsutomu; Sagiyama, Masaru; Kawabe, Masaki; Tsujihara, Toshiyuki; and Takushima, Shigehiro, 4,929,324, Cl. 204-206.000.

Saha, Chandan K.: *See*—
Atwell, William H.; Burns, Gary T.; and Saha, Chandan K., 4,929,573, Cl. 501-90.000.

Saigo, Akira; Maezawa, Shigenari; Kageyama, Tomoaki; Ishikura, Keizaburo; Sera, Akio; and Suehiro, Junji, to Mitsui Petrochemical Industries, Ltd. Method of and apparatus for assessing insulation conditions. 4,929,903, Cl. 324-544.000.

Saimi, Tetsuo: *See*—
Kato, Makoto; Saimi, Tetsuo; and Ohara, Shunji, 4,929,823, Cl. 250-201.500.

St. Laurent, Christian: *See*—
Kuzuhara, Michio; Shibasaki, Jun; St. Louis, Andree; St. Laurent, Christian; and Bedard, Michel, 4,928,431, Cl. 49-479.000.

St. Louis, Andree: *See*—
Kuzuhara, Michio; Shibasaki, Jun; St. Louis, Andree; St. Laurent, Christian; and Bedard, Michel, 4,928,431, Cl. 49-479.000.

Saito, Jun: *See*—
Uto, Nobutaka; Shido, Hironori; Saito, Jun; Hiroi, Masakazu; Kobayashi, Kenji; Murakami, Koichi; and Naito, Masataka, 4,928,941, Cl. 270-53.000.

Saito, Junya: *See*—
Yamamoto, Yoshihiro; Saito, Junya; and Suzuki, Masakazu, 4,930,004, Cl. 358-29.000.

Saito, Kenji: *See*—
Sakai, Kunihiro; Miyazaki, Toshihiko; Eguchi, Ken; Kawada, Haruki; Tomida, Yoshinori; Kimura, Toshiaki; Matsuda, Hiroshi; Takimoto, Kiyoshi; and Saito, Kenji, 4,929,524, Cl. 430-56.000.

Saito, Shigeaki; Matsueda, Toshiharu; Kubota, Yoshihiro; and Iguchi, Masaaki, to Furukawa Co., Ltd.; and Shin-Etsu Chemical Co., Ltd. Dopant of arsenic, method for the preparation thereof and method for doping of semiconductor therewith. 4,929,572, Cl. 437-164.000.

Saka, Tsutomu: *See*—
Niizato, Tomonori; Tanai, Tsuneo; Kasahara, Kazuhiro; Saka, Tsutomu; and Oikawa, Toshihiro, 4,928,641, Cl. 123-90.160.

Sakagaito, Yukuo: *See*—
Masaki, Takeshi; Kawata, Koichi; and Sakagaito, Yukuo, 4,928,435, Cl. 51-55.000.

Sakai, Kunihiro; Miyazaki, Toshihiko; Eguchi, Ken; Kawada, Haruki; Tomida, Yoshinori; Kimura, Toshiaki; Matsuda, Hiroshi; Takimoto, Kiyoshi; and Saito, Kenji, to Canon Kabushiki Kaisha. Organic photo conductive medium. 4,929,524, Cl. 430-56.000.

Sakai, Norio: *See*—
Kohno, Yoshiaki; and Sakai, Norio, 4,929,295, Cl. 156-230.000.

Sakai, Takeo: *See*—
Tanaka, Mitsugu; and Sakai, Takeo, 4,929,277, Cl. 106-22.000.

Sakai, Takeshi; and Ito, Tsuneo, to NDC Company, Ltd. Sliding bearing and crankshaft used for crankshaft-connecting rod assembly. 4,928,570, Cl. 74-595.000.

Sakamoto, Hideshi: *See*—
Daimon, Takashi; Sakamoto, Hideshi; and Akimoto, Osamu, 4,929,496, Cl. 428-246.000.

Sakamoto, Hideyuki: *See*—
Kiminami, Ikuo; Sakamoto, Hideyuki; and Nose, Toshimitsu, 4,928,499, Cl. 62-186.000.

Sakamoto, Kiichiro; and Iwasaki, Hideo, to Fuji Photo Film Co., Ltd. Developing apparatus. 4,929,974, Cl. 354-299.000.

Sakamoto, Kiichiro: *See*—
Oshikoshi, Yuji; Suganuma, Yoshimi; Hara, Hiroshi; Shiota, Kazuo; Takehara, Nobumitsu; and Sakamoto, Kiichiro, 4,928,996, Cl. 283-109.000.

Sakuma, Yoshinori: *See*—
Abe, Shinya; Miyamoto, Mitsuaki; Tanaka, Masayuki; Akasaka, Kozo; Hayashi, Kenji; Kawahara, Tetsuya; Katayama, Satoshi; Sakuma, Yoshinori; Suzuki, Takeshi; and Yamatsu, Isao, 4,929,623, Cl. 514-293.000.

Saladin, Guenter: *See*—
Taglieber, Volker; Hoelderich, Wolfgang; Kummer, Rudolf; Mross, Wolf D.; and Saladin, Guenter, 4,929,758, Cl. 564-485.000.
Taglieber, Volker; Hoelderich, Wolfgang; Kummer, Rudolf; Mross, Wolf D.; and Saladin, Guenter, 4,929,759, Cl. 564-485.000.

Salama, Simon: *See*—
Avni, Eitan; Salama, Simon; and Turi, Eran, 4,929,474, Cl. 427-326.000.

Salerno, Don: *See*—
Henderson, Don J.; Brady, Robert; Gamble, Foster R.; Hardt, James V.; Friedfeld, Howard; Salerno, Don; Swanson, Tad; and Sansing, Maureen R., 4,928,696, Cl. 128-644.000.

Sallas, John J., to Halliburton Geophysical Services, Inc. Suppression of air-coupled noise produced by seismic vibrators. 4,930,113, Cl. 367-190.000.

Salomon S. A.: *See*—
Montfort, Benoit, 4,928,406, Cl. 36-117.000.

Salomon S.A.: *See*—
Hue, Jean, 4,928,988, Cl. 280-607.000.
Rullier, Pierre, 4,928,990, Cl. 280-625.000.

Salvan, Michel: *See*—
de Bcisseron, Bertrand; Salvan, Michel; and Gugenhein, Michele, 4,930,124, Cl. 370-94.300.

Salvia-Werk Gesellschaft zur Herstellung chemischer und pharmazeutischer Erzeuginisse mbH: *See*—
Breitenfelder, Wilhelm; and Trenkner, Fritz, 4,928,684, Cl. 128-204.210.

Sames S.A.: *See*—
Prus, Eric; Frene, Andre ; Bordaz, Pascal; Guerange, Patrick; and Thome, Caryl, 4,928,880, Cl. 239-8.000.

Sampson, Edward J., to Shiley Infusaid, Inc. Snap-lock fitting catheter for an implantable device. 4,929,236, Cl. 604-175.000.

Sampson, Robert; and Flanigan, Sean, to Wasco Products, Inc. Skylight construction. 4,928,445, Cl. 52-72.000.

Samsonite Corporation: *See*—
Green, Stephen T.; and Van Hoye, Willibald, 4,928,800, Cl. 190-115.000.

Samsung Electronics, Co., Ltd.: *See*—
Kim, Byeng-yun; and Park, Yong-bo, 4,929,853, Cl. 307-475.000.

Samsung Semiconductor & Telecommunications Co.: *See*—
Bae, Myung H., 4,929,852, Cl. 307-475.000.

Sanada, Takashi: *See*—
Abe, Hiroomi; Nishio, Taichi; Suzuki, Yasurou; Sanada, Takashi; and Tsuji, Mitsuji, 4,929,675, Cl. 525-66.000.

Sanborn, George W., to Sanborn, Inc. Portable ultra-filtration system. 4,929,351, Cl. 210-195.200.

Sanborn, Inc.: *See*—
Sanborn, George W., 4,929,351, Cl. 210-195.200.

Sanchez, Joseph P.: *See*—
Culbertson, Townley P.; Domagala, John M.; Hagen, Susan E.; and Sanchez, Joseph P., 4,929,613, Cl. 514-210.000.

Sandbank, Barry M., to Smith & Nephew plc. Adhesive coated dressing and applicators therefor. 4,928,680, Cl. 128-155.000.

Sanden Corporation: *See*—
Negishi, Kozabro, 4,928,501, Cl. 62-406.000.

Sander, Ingolf, to Verbatim Corporation. Method and apparatus for anamorphically shaping and deflecting electromagnetic beams. 4,929,067, Cl. 350-421.000.

Sandford, Philip: *See*—
Butler, David R.; Snow, George; Sandford, Philip; Neu, Max G.; Villani, Jean P.; Teyssedre, Alain; and Lenoir, Roland, 4,928,746, Cl. 164-36..000.

Sankyo Company Limited: *See*—
Mizushima, Shoji; and Yamagata, Hideo, 4,929,559, Cl. 435-252.330.

Sano, Junji: *See*—
Fuse, Toshikazu; Yamamoto, Atsushi; and Sano, Junji, 4,929,248, Cl. 8-128.100.

Sanpei, Tetsuya: *See*—
Moriya, Yutaka; Sanpei, Tetsuya; and Tagawa, Hisatoshi, 4,929,289, Cl. 148-402.000.

Sans, Claude: *See*—
Delfour, Andre ; Falempin, Francois; Isbert, Jacques; and Sans, Claude, 4,929,079, Cl. 356-336.000.

Sanshin Kogyo Kabushiki Kaisha: *See*—
Shiozawa, Shigeki, 4,929,204, Cl. 440-112.000.

Sansing, Maureen R.: *See*—
Henderson, Don J.; Brady, Robert; Gamble, Foster R.; Hardt, James V.; Friedfeld, Howard; Salerno, Don; Swanson, Tad; and Sansing, Maureen R., 4,928,696, Cl. 128-644.000.

Santa Barbara Research Center: *See*—
Pagano, Thomas S.; and Turtle, RObert R., 4,929,040, Cl. 350-6.500.

Santel, Hans-Joachim: *See*—
Forster, Heinz; Beck, Gunther; Klauke, Erich; Santel, Hans-Joachim; and Schmidt, Robert R., 4,929,743, Cl. 548-187.000.

Sanyo Electric Co., Ltd.: *See*—
Hosoya, Nobukazu, 4,930,003, Cl. 358-19.000.
Houjiyou, Yuji; Hayasaki, Hiroyuki; and Yonezawa, Kyoichi, 4,929,844, Cl. 250-561.000.

Sapak, David L.: *See*—
Hayden, Joseph S.; Sapak, David L.; and Ward, Julia M., 4,929,387, Cl. 252-301.40P.

Sardella, Louis M. Rotary type feeder machines and methods. 4,928,950, Cl. 271-112.000.

Sartor, Mariano: *See*—
Baggio, Giorgio; Gonella, Mario; and Sartor, Mariano, 4,928,408, Cl. 36-119.000.

Sasagawa, Katsuyoshi: *See*—
Nagata, Teruyuki; Okazaki, Koju; Kajimoto, Nobuyuki; Miura, Tohru; Kanemura, Yoshinobu; and Sasagawa, Katsuyoshi, 4,929,707, Cl. 528-76.000.

Sasai, Tsuguhisa, to Olympus Optical Co., Ltd. Ultrasonic diagnosis device. 4,928,699, Cl. 128-662.060.

Sasaki, Hiroki: *See*—
Yonezawa, Akihiro; Sasaki, Hiroki; Mitsuyuki, Yoichiro; Mori, Yasuki; and Ishigami, Toshihiko, 4,929,869, Cl. 313-639.000.

Sasaki, Takashi: *See*—
Sato, Ryosuke; Kato, Katsunori; Sasaki, Takashi; and Sugita, Hiroshi, 4,929,539, Cl. 430-553.000.

Sasakura Engineering Co., Ltd.: *See*—
Imai, Masaaki; and Uemura, Minoru, 4,929,347, Cl. 210-101.000.

Sato, Hiroshi, to Mitsubishi Jukogyo Kabushiki Kaisha. Splicing system. 4,929,297, Cl. 156-361.000.

Sato, Koichi; and Ikeda, Masami, to Canon Kabushiki Kaisha. Method for preparing liquid jet recording head, liquid jet recording head prepared by said method and liquid jet recording device having said liquid jet recording head mounted thereon. 4,929,964, Cl. 346-1.100.

Sato, Mitsuya; Ukaji, Takao; Yamaguchi, Nobuhito; Ohmori, Taro; and Murakami, Eiichi, to Canon Kabushiki Kaisha. Wafer prober. 4,929,893, Cl. 324-158.00F.

Sato, Robert N., to Hughes Aircraft Company. GaAs focal plane array readout. 4,929,913, Cl. 330-308.000.

Sato, Ryosuke; Kato, Katsunori; Sasaki, Takashi; and Sugita, Hiroshi, to Konishiroku Photo Industry Co., Ltd. Silver halide photosensitive materials for color photography. 4,929,539, Cl. 430-553.000.

Sato, Shogo: *See*—
Kunimaru, Noritaka; Shiba, Katsuhiro; Kudo, Norio; Inoshita, Gen; and Sato, Shogo, 4,930,028, Cl. 360-85.000.

Sato, Takayoshi. Ice-cream cones. 4,929,457, Cl. 426-139.000.

Sato, Takayuki: *See*—
Ishikawa, Tadashi; Tagami, Shigeru; Akimoto, Kazuo; Tsuyuki, Hiroto; Kawai, Michio; Ito, Kanji; Sato, Takayuki; Otora, Takahito; and Hayakawa, Teruyo, 4,929,977, Cl. 354-420.000.

Sato, Toshiaki: *See*—
Moritani, Tohei; Oda, Hidemasa; Sato, Toshiaki; Negi, Taichi; Matsumura, Keiji; Kawai, Syuji; Tanaka, Nobuo; and Hirofuji, Satoshi, 4,929,482, Cl. 428-36.400.

Satoh, Kazuhiko: *See*—
Hayase, Isao; Ushiku, Kenichi; Tejima, Kunisuke; Hayashi, Seiichi; and Satoh, Kazuhiko, 4,929,159, Cl. 417-295.000.

Satou, Hiroyuki; and Ookawa, Norio, to Fuji Photo Film Co., Ltd. Feeder for feeding photosensitive material. 4,928,897, Cl. 242-55.000.

Satter, Inc.: *See*—
Jakobsen, Katherine, 4,928,819, Cl. 206-316.200.

Sauer, Heinz, to Rasmussen GmbH. Device for coupling a hose to a pipe. 4,929,002, Cl. 285-319.000.

Saunders-Roe Development Limited: *See*—
Bright, Alfred N., 4,928,414, Cl. 40-551.000.

Sawada, Hiroyuki: *See*—
Furuhashi, Kenshi; and Sawada, Hiroyuki, 4,929,806, Cl. 200-61.540.

Sawada, Yoshihisa: *See*—
Kitagawa, Kazuo; Komatsu, Fumiaki; Masuki, Takayoshi; Sawada, Yoshihisa; and Inada, Eiichi, 4,929,394, Cl. 252-633.000.

Sawaf, Bernard E.: *See*—
Smirlock, Martin E.; Ribich, William A.; Marinaccio, Paul J.; and Sawaf, Bernard E., 4,928,575, Cl. 89-36.020.

Sawai, Kiichi; Kurono, Masayasu; Asai, Hiromiotu; Mitani, Takahiko; Ninomiya, Naohisa; Sugiyama, Takao; Furukawa, Eiji; and Michishita, Hisashi, to Kabushiki Kaisha Sanwa Kagaku Kenkyusho. Preventives and remedies for medicinal and alcoholic poisoning. 4,929,438, Cl. 424-10.000.

Sayles, Delbert E., Sr., to Sayles & Scheel Enterprises, Incorporated. Conductive composition and method of use. 4,929,390, Cl. 252-510.000.

Sayles & Scheel Enterprises, Incorporated: *See*—
Sayles, Delbert E., Sr., 4,929,390, Cl. 252-510.000.

Sayre, Edwin D.: *See*—
Dixon, Robert C.; Cearley, James E.; Van Diemen, Paul; Sayre, Edwin D.; and Gordon, Gerald M., 4,929,412, Cl. 376-260.000.

Scalbassi, Robert J.: *See*—
Sekhar, Laligam N.; Scalbassi, Robert J.; Sun, Mingui; and Wasserman, Jacob F., 4,928,705, Cl. 128-773.000.

Scapini, Giancarlo: *See*—
Ferruti, Paolo; and Scapini, Giancarlo, 4,929,750, Cl. 560-87.000.

Scepter Manufacturing Company Limited: *See*—
Arthurs, Raymond C., 4,928,841, Cl. 220-21.000.

Schablonentechnik Kufstein GmbH: *See*—
Ruckl, Siegfried, 4,928,593, Cl. 101-389.100.

Schaefer, Robert D.: *See*—
La Plante, John A.; and Schaefer, Robert D., 4,929,073, Cl. 350-609.000.

Schaeffer GmbH: *See*—
Collas, Wolfgang; Wolfertz, Gunter; and Wolfertz, Roger, 4,928,362, Cl. 24-90.00R.

Schaepers, Arno; and Grabherr, Bernd, to Zeppelin-Metallwerke GmbH. Electromagnetically shielded cabin. 4,929,802, Cl. 174-35.0MS.

Schaper, Siegfried; and Seufert, Martin, to Audi AG. Method for electroplating a conducting surface. 4,929,315, Cl. 204-18.100.

Schatz, Oskar. Multicylinder IC engine with a stroke charging device. 4,928,639, Cl. 123-52.0MF.

Schatz, Oskar; Mehne, Georg; and Steidele, Thomas. Method of operating an IC engine and an IC engine for performing the method. 4,928,648, Cl. 123-403.000.

Schefczik, Ernst: *See*—
Hansen, Guenter; Schefczik, Ernst; and Reichelt, Helmut, 4,929,720, Cl. 534-766.000.

Scheffler, Gerhard; Niemeyer, Ulf; Brock, Norbert; and Pohl, Jorg, to ASTA Pharma Aktiengesellshaft. oxazaphosphorin-4-thio alkanesulphonic acids, neutral salts thereof and method to treat cancer diseases and to produce immunosuppression. 4,929,607, Cl. 514-110.000.

Schellstede, Herman J.; McQueen, Robert W.; and Peters, Alan D., to Penetrators, Inc. Hydraulic well penetration apparatus. 4,928,757, Cl. 166-55.100.

Schering Aktiengesellschaft: *See*—
Mahlkow, Hartmut; Romer, Michael; Rosskamp, Gunther; Seidenspinner, Hubert-Matthias; Stein, Ludwig; and Strache, Waltraud, 4,929,422, Cl. 427-57.000.

Schering Corporation: *See*—
Haslanger, Martin F.; Neustadt, Bernard R.; and Smith, Elizabeth M., 4,929,641, Cl. 514-506.000.

Scheuermann, Rainer, to Bauerfeind GmbH & Co. Heel cushion. 4,928,404, Cl. 36-37.000.

Schiemann, Wolfram. Plastic-canister screw closure. 4,928,861, Cl. 222-481.500.

Schiffman, Eric L.; Fricton, James R.; and Espy, Lawrence M., to University of Minnesota, Regents of the. Electronic pressure algometer apparatus. 4,928,707, Cl. 128-774.000.

Schipper, Paul H.: *See*—
Herbst, Joseph A.; Owen, Hartley; and Schipper, Paul H., 4,929,337, Cl. 208-120.000.

Schips, Helmut. Apparatus for joining the pocket trimming and the pocket bag in trouser pockets. 4,928,608, Cl. 112-121.120.

Schirmer, Henry G., to W. R. Grace & Co.-Conn. Oxygen-barrier retort pouch. 4,928,474, Cl. 53-425.000.

Schisler, Robert C.: *See*—
Allen, Terry F.; and Schisler, Robert C., 4,929,688, Cl. 525-332.500.

Schlepfer, Walter: *See*—
Hanselmann, Daniel; and Schlepfer, Walter, 4,928,354, Cl. 19-97.000.

Schleupen, Richard: *See*—
Sohner, Gerhard; Roth, Helmut; Brammer, Hartmut; Schleupen, Richard; and Nubel, Karl-Heinz, 4,928,660, Cl. 123-647.000.

Schlichting, Jorg: *See*—
Rondot, Klaus; and Schlichting, Jorg, 4,928,814, Cl. 206-215.000.

Schlote, David S.: *See*—
Potter, Gary J.; Schlote, David S.; and Reinkemeyer, Robert W., 4,929,541, Cl. 432-222.000.

Schlumberger Systems, Inc.: *See*—
Schroeder, Brian D.; and Deering, Michael F., 4,930,091, Cl. 364-522.000.

Schlumberger Technology Corporation: *See*—
Jardine, Stuart, 4,928,521, Cl. 73-151.000.

Schmidt, Donald L.; McCrackin, Perry J.; and Coburn, Charles E., to Dow Chemical Company, The. Fluorocarbon containing, reactive polymeric surfactants and coating compositions therefrom. 4,929,666, Cl. 524-516.000.

Schmidt, Donald L.: *See*—
Cheng, Roberta C.; Wessling, Ritchie A.; and Schmidt, Donald L., 4,929,556, Cl. 435-180.000.

Schmidt, Erhard: *See*—
Grasser, Franz; Reichenberger, Helmut; Hassler, Dietrich; Naser, Georg; and Schmidt, Erhard, 4,928,672, Cl. 128-24.00A.

Schmidt, Robert J.; and Haizmann, Robert S., to UOP. Hydrothreatment-isomerization without hydrogen recycle. 4,929,794, Cl. 585-737.000.

Schmidt, Robert R.: *See*—
Forster, Heinz; Beck, Gunther; Klauke, Erich; Santel, Hans-Joachim; and Schmidt, Robert R., 4,929,743, Cl. 548-187.000.

Schmidt, Rudiger: *See*—
Gebhardt, Axel; Diekmann, Bernd; and Schmidt, Rudiger, 4,928,428, Cl. 49-192.000.

Schnatterer, Albert; and Fiege, Helmut, to Bayer Aktiengesellschaft. Process are the preparation of p-hydroxy-benzaldehydes. 4,929,766, Cl. 568-432.000.

Schnatwinkel, Michael: *See*—
Strate, Rudiger; Schulze, Rainer; Schnatwinkel, Michael; Wagner, Georg; Wilmes, Manfred; Haller, Bernd; Herkner, Ernst; Diekmann, Jorg; and Henning, Herbert, 4,929,198, Cl. 439-709.000.

Schnebly, John; and Marusak, Thomas J., to Comfortex Corporation. Method of making a pleated blind with articulative slat extensions. 4,928,369, Cl. 29-24.500.

Schneider, Alan M.; and Doherty, Donald W., to United States of America, Navy. Search-radar azimuth correction. 4,929,952, Cl. 342-184.000.

Schneider, Joachim: *See*—
Fukamachi, Chiharu; Schumacher, Horst; Bewert, Wolfgang; and Schneider, Joachim, 4,929,774, Cl. 568-824.000.

Schneider, Norbert: *See*—
Melwisch, Harald; and Schneider, Norbert, 4,928,389, Cl. 30-43.920.

Schneider (USA), Inc.: *See*—
Goodin, Richard L.; Rydell, Mark A.; and Shockey, Rick L., 4,928,693, Cl. 128-637.000.

Schoeller & Hoesch GmbH: *See*—
Mentzel, Edgar; and Meixner, Ferdinand, 4,928,715, Cl. 131-365.000.

Schofield, Robert C. Squeeze roll and actuator assembly utilizing inflatable bags. 4,928,589, Cl. 100-170.000.

Scholl, Thomas; Jabs, Gert; and Richartz, Adolf, to Bayer Aktiengesellschaft. Hydroxycarboxylic acid/Unsaturated aromatic hydrocarbon resin useful as recording material. 4,929,710, Cl. 528-205.000.

Schonauer, Sylvia L.; Medina, Linda M.; and Neel, Donald V., to Frito-Lay, Inc. Process for producing batch type potato chips on a continuous basis. 4,929,461, Cl. 426-438.000.

Schonert, Dieter: *See*—
Osarek, Werner; Pempera, Franz G.; and Schonert, Dieter, 4,928,717, Cl. 134-64.00R.

Schonfeld, Erwin: *See*—
Meyer, Gundolf; Schonfeld, Erwin; and Verpoort, Clemens, 4,929,596, Cl. 505-1.000.

Schonfeld, Steven E.: *See*—
Roland, Charles M.; Bohm, Georg G. A.; and Schonfeld, Steven E., 4,929,684, Cl. 525-274.000.

Schorfheide, James T.: *See*—
Cody, Ian A.; Hamner, Glen P., deceased; and Schorfheide, James T., 4,929,795, Cl. 585-739.000.

Schott Glass Technologies, Inc.: *See*—
Hayden, Joseph S.; Sapak, David L.; and Ward, Julia M., 4,929,387, Cl. 252-301.40P.

Schrader, Jurgen; and Claar, Klaus, to Deimler-Benz AG. Strut for a folding vehicle cover. 4,929,020, Cl. 296-118.000.

Schrauth, Peter A.: *See*—
Carpenter, Larry L.; Hagerty, Robert J.; Maschmeyer, Richard O.; Morrell, Mark L.; and Schrauth, Peter A., 4,929,265, Cl. 65-64.000.

Schroeder, Brian D.; and Deering, Michael F., to Schlumberger Systems, Inc. Triangle classification setup method and apparatus for 3-D graphics display system. 4,930,091, Cl. 364-522.000.

Schroepfer, Richard C.: *See*—
Korsunsky, Iosif; and Schroepfer, Richard C., 4,929,194, Cl. 439-571.000.

Schroer, Wolf-Dieter: *See*—
Bachem, Henning; Suling, Carlhans; Muszik, Janos; and Schroer, Wolf-Dieter, 4,929,309, Cl. 162-164.300.
Schubert, Erdmann F., to American Telephone and Telegraph Company. Optical communications modulator device. 4,929,064, Cl. 350-355.000.
Schucker, Robert C., to Exxon Research and Engineering Company. Isocyanurate crosslinked polyurethane membranes and their use for the separation of aromatics from non-aromatics. 4,929,357, Cl. 210-640.000.
Schuco Heinz Schurmann GmbH & Co.: *See*—
Gebhardt, Axel; Diekmann, Bernd; and Schmidt, Rudiger, 4,928,428, Cl. 49-192.000.
Schuh, David N. Bearing clearance detector. 4,928,400, Cl. 33-605.000.
Schult, Klaus; Kister, Horst; and Quenzer, Michael, to VDO Adolf Schindling AG. Fastening device for the attaching of an electric transmitter. 4,928,531, Cl. 73-855.000.
Schulte-Elte, Karl-Heinrich: *See*—
Giersch, Wolfgang K.; and Schulte-Elte, Karl-Heinrich, 4,929,599, Cl. 512-18.000.
Schulte, Karl-Heinz, to Muhr und Bender Maschinenbau GmbH. Machine tool. 4,928,377, Cl. 29-560.000.
Schulz, Paul; Schwadtke, Karl; and Smulders, Eduard, to Henkel Kommanditgesellschaft aug Aktien. Process for the preparation of a storage-stable liquid detergent composition. 4,929,380, Cl. 252-121.000.
Schulze, Rainer: *See*—
Strate, Rudiger; Schulze, Rainer; Schnatwinkel, Michael; Wagner, Georg; Wilmes, Manfred; Haller, Bernd; Herkner, Ernst; Diekmann, Jorg; and Henning, Herbert, 4,929,198, Cl. 439-709.000.
Schumacher, Horst: *See*—
Fukamachi, Chiharu; Schumacher, Horst; Bewert, Wolfgang; and Schneider, Joachim, 4,929,774, Cl. 568-824.000.
Schupp, Gerhard; Tscheschlok, Klaus; and Johann, Maischberger, to KUKA Schweissanlagen and Roboter GmbH. Mounting arrangement for the automatic assembly of aggregates prefabricated parts to a car body from below. 4,928,386, Cl. 29-824.000.
Schurmann, Gottfried: *See*—
Kalitzki, Siegfried; Peters, Josef; and Schurmann, Gottfried, 4,928,477, Cl. 57-416.000.
Schwadtke, Karl: *See*—
Schulz, Paul; Schwadtke, Karl; and Smulders, Eduard, 4,929,380, Cl. 252-121.000.
Schwander, Hansrudolf; Tzikas, Athanassios; and Aeschlimann, Peter, to Ciba-Geigy Corporation. Fiber-reactive dyes containing an aniline radical which carries two different vinylsulfonyl moieties. 4,929,719, Cl. 534-604.000.
Schwane, Walter H.: *See*—
Batra, Surinder P.; Hammer, William E.; Lushinsky, Gene A.; Marquart, David W.; Schwane, Walter H.; and Ziecina, Frederick J., 4,930,069, Cl. 364-200.000.
Schwark, Joanne M., to Hercules Incorporated. Isocyanate- and isothiocyanate-modified polysilazane ceramic precursors. 4,929,704, Cl. 528-28.000.
Schwarz, Horst: *See*—
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Schwarzmann, Matthias: *See*—
Hesse, Michael; Hoelderich, Wolfgang; and Schwarzmann, Matthias, 4,929,733, Cl. 546-184.000.
Scott, Dennis J.; and Calfo, Raymond M., to Westinghouse Electric Corp. Pulsed AC electromagnetic projectile launcher apparatus. 4,928,572, Cl. 89-8.000.
Scott, Richmond: *See*—
Tilman, Paul A.; Machacek, Zdenek; and Scott, Richmond, 4,929,487, Cl. 428-163.000.
Scribner, Richard M.: *See*—
Pennev, Penio; Rajagopalan, Parthasarathi; and Scribner, Richard M., 4,929,627, Cl. 514-320.000.
Scripps Clinic and Research Foundation: *See*—
Harker, Laurence A.; and Hanson, Stephen R., 4,929,602, Cl. 514-18.000.
Sea View Enterprises: *See*—
Forman, Willis R., 4,928,614, Cl. 114-66.000.
Sebranek, Joseph G.: *See*—
Huebner, Patrick H.; Sebranek, Joseph G.; Olson, Dennis G.; and Anderson, Eugene A., 4,928,892, Cl. 241-82.500.
Secord, Tyrone R., to Fiaber Dynamics Corporation. Power seat recliner. 4,929,024, Cl. 297-362.000.
Seevinck, Evert: *See*—
Davies, Thomas J.; Seevinck, Evert; Pfennings, Leonardus C. M. G., deceased; Kennen, Henricus J.; Voss, Peter H.; O'Connell, Cormac M.; Phelan, Cathal G.; and Outrop, Hans, 4,929,911, Cl. 330-264.000.
Seidenspinner, Hubert-Matthias: *See*—
Mahlkow, Hartmut; Romer, Michael; Rosskamp, Gunther; Seidenspinner, Hubert-Matthias; Stein, Ludwig; and Strache, Waltraud, 4,929,422, Cl. 427-57.000.
Seidman, Sheldon, to Automatic Findings, Inc. Earring clutch. 4,928,367, Cl. 24-705.000.
Seidoh, Masami, to Jupiter Denisu Co., Ltd. Shield connector. 4,929,195, Cl. 439-610.000.
Seiko Epson Corporation: *See*—
Aoki, Kenji; Takei, Katsumori; Nakamura, Haruo; and Matsushita, Yoshikazu, 4,929,057, Cl. 350-333.000.
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Seikosha Co., Ltd.: *See*—
Ishikawa, Tadashi; Tagami, Shigeru; Akimoto, Kazuo; Tsuyuki, Hiroto; Kawai, Michio; Ito, Kanji; Sato, Takayuki; Otora, Takahito; and Hayakawa, Teruyo, 4,929,977, Cl. 354-420.000.
Seiler, Larry D.; Pappas, James L.; and Rose, Robert C., to Digital Equipment Corporation. Data path chip test architecture. 4,929,889, Cl. 371-22.300.
Seiss, Willi: *See*—
Torbus, Marek; Jerman, Franz; Ladegourdie, Gerard; Lingemann, Dirk; Seiss, Willi; and Vujevic, Aleksandar, 4,929,649, Cl. 523-145.000.
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Sirvet, Enn, 4,928,511, Cl. 72-361.000.
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Alexander, James C., 4,928,340, Cl. 14-71.300.
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Kooiman, Cornelis A.; and McDevitt, John J., Sr., 4,929,254, Cl. 48-76.000.
Setoi, Hiroyuki; Kuroda, Akio; Tanaka, Hirokazu; Hirai, Hideo; Marusawa, Hiroshi; and Hashimoto, Masashi, to Fujisawa Pharmaceutical Company, Ltd. Oxygen-containing heterocyclic compound. 4,929,639, Cl. 514-452.000.
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Schaper, Siegfried; and Seufert, Martin, 4,929,315, Cl. 204-18.100.
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Shaffer, Harold K.; and Barnsby, Roger M., to United Technologies Corporation. Rotating shaft seal. 4,928,978, Cl. 277-25.000.
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Guzik, Andrzej T.; Curtis, James H.; Habbaba, Faris S.; and Shah, Kirit, 4,929,062, Cl. 350-345.000.
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Inui, Koichi, 4,929,970, Cl. 346-160.000.
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Yoshida, Masaru; Yoshikawa, Mitsuhiko; Yoshimoto, Yoshikazu; Wada, Hiroshi; Suzuki, Tomonari; and Nakajima, Shigeo, 4,929,803, Cl. 174-117.00M.
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Shaw, William S., to Tri Fire Holdings, Ltd. Gas fire heating unit. 4,928,667, Cl. 126-512.000.

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McBeath, Les L.; Sheikholeslami, Amir M.; and Turro, Glenn T., 4,929,933, Cl. 340-703.000.

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McArthur, Alastair; Davis, Royston H.; Hilton, Mark D.; Newton, Trevor W.; and Patel, Dinesh M., 4,929,628, Cl. 514-364.000.

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De Jong, Feike; Dannesberg, Willem; and Vermeule, Jacob, 4,929,374, Cl. 252-39.000.
Slaugh, Lynn H.; Johnson, Thomas H.; and Hoxmeier, Ronald J., 4,929,584, Cl. 502-112.000.
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Swisher, David R., 4,929,244, Cl. 604-319.000.

Sheth, Paresh J., to Exxon Chemical Patents Inc. Composite breathable housewrap films. 4,929,303, Cl. 156-209.000.

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Kuzuhara, Michio; Shibasaki, Jun; St. Louis, Andree; St. Laurent, Christian; and Bedard, Michel, 4,928,431, Cl. 49-479.000.

Shibata, Yasuhiro: *See*—
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Shibatani, Haruo: *See*—
Takahashi, Kunimasa; Kameda, Takashi; and Shibatani, Haruo, 4,929,404, Cl. 264-29.500.

Shibayama, Atsushi, to Nikon Corporation. Zoom lens. 4,929,069, Cl. 350-423.000.

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Shibuya, Yukio: *See*—
Fujigaki, Takashi; Fujinaga, Yoshikazu; Tokuda, Shuichiro; Furukawa, Noriyuki; Ichimura, Kiyoshi; Shibuya, Yukio; and Iuchi, Shigeru, 4,929,169, Cl. 425-385.000.

Shidara, Shinichi, to Fuji Photo Film Co., Ltd. Automatic film processor. 4,929,975, Cl. 354-317.000.

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Shigematsu, Tomohisa: *See*—
Matsumoto, Osamu; Maruyama, Tadashi; Murata, Hiroyoshi; Abe, Isao; Shigematsu, Tomohisa; Shinada, Kazuyoshi; Suzuki, Yasoji; and Kobayashi, Ichiro, 4,930,105, Cl. 365-185.000.

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Kitayama, Shinichiro; Adachi, Teruho; Ueda, Masahiro; Aoki, Yuichi; Shiiki, Satoshi; Takigawa, Akio; Yoshida, Motoaki; Imamura, Naoya; Maeda, Koichi; and Kayanoki, Hisayuki, 4,929,523, Cl. 430-4.000.

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Kainosho, Keiji; Shimakura, Haruhito; and Oda, Osamu, 4,929,564, Cl. 437-20.000.

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Nagano, Masashi, 4,928,549, Cl. 74-594.600.

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Shimizu, Hiroshi, to NEC Corporation. Method for controlling address parameters for interconnecting law and ISDN. 4,930,123, Cl. 370-94.100.

Shimizu, Misao: *See*—
Shimizu, Giichiro; Shimizu, Misao; Takeuchi, Hajime; Okuyama, Toshiharu; and Wakatuski, Yoshio, 4,930,096, Cl. 364-550.000.

Shimoda, Kazuharu: *See*—
Ohmura, Yukihiro; Kobayashi, Yoshiyuki; Hosoi, Keiji; and Shimoda, Kazuharu, 4,928,659, Cl. 123-588.000.

Shimohigashi, Katsuhiro: *See*—
Tanaka, Hitoshi; Hori, Ryoichi; Itoh, Kiyoo; Kimura, Katsutaka; and Shimohigashi, Katsuhiro, 4,930,112, Cl. 365-226.000.

Shimomura, Akihiro: *See*—
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Shimon Klier: *See*—
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Shin-Etsu Chemical Co., Ltd.: *See*—
Saito, Shigeaki; Matsueda, Toshiharu; Kubota, Yoshihiro; and Iguchi, Masaaki, 4,929,572, Cl. 437-164.000.

Shinada, Kazuyoshi: *See*—
Matsumoto, Osamu; Maruyama, Tadashi; Murata, Hiroyoshi; Abe, Isao; Shigematsu, Tomohisa; Shinada, Kazuyoshi; Suzuki, Yasoji; and Kobayashi, Ichiro, 4,930,105, Cl. 365-185.000.

Shinko Kosen Kogyo Kabushiki Kaisha: *See*—
Kurauchi, Makoto; Hashimoto, Michio; Hayasaki, Kiyoshi; Minami, Toshikazu; Ohnishi, Mutsuhiko; and Suzuki, Yohei, 4,929,650, Cl. 523-455.000.

Shinoki, Masayoshi; Takagi, Masahiro; Nagatsuka, Ikutaroh; Kumashiro, Koichi; Aoki, Takayoshi; and Takeda, Masayuki, to Fuji Xerox Co., Ltd. Coated carrier for developer. 4,929,528, Cl. 430-108.000.

Shinya, Yoshiyuki; Tabara, Yoshitaka; Okuno, Itaru; Kaneko, Tadashi; and Watanabe, Tomomi, to Mazda Motor Corporation. Engine control system for suppressing car body vibration. 4,928,652, Cl. 123-417.000.

Shiobara, Yashuhisa, to Kabushiki Kaisha Toshiba. Network system using token-passing bus with multiple priority levels. 4,930,121, Cl. 370-85.400.

Shiota, Kazuo, to Fuji Photo Film Co., Ltd. Method of making a print of color slide. 4,930,009, Cl. 358-76.000.

Shiota, Kazuo: *See*—
Oshikoshi, Yuji; Suganuma, Yoshimi; Hara, Hiroshi; Shiota, Kazuo; Takehara, Nobumitsu; and Sakamoto, Kiichiro, 4,928,996, Cl. 283-109.000.

Shiozawa, Shigeki, to Sanshin Kogyo Kabushiki Kaisha. Water entry preventing structure for inboard/outboard motor. 4,929,204, Cl. 440-112.000.

Shipkowski, James P., to Eastman Kodak Company. Solid state relay having visual contact monitor. 4,929,932, Cl. 340-644.000.

Shippen, Mark A. Method of making a reusable adhesive product. 4,929,401, Cl. 264-22.000.

Shir, Ching-Cheng: *See*—
Yamashita, Tsutomu T.; Shir, Ching-Cheng; and Chen, Tu, 4,929,500. Cl. 428-336.000.

Shirakawa, Junji: *See*—
Ainoya, Masayuki; Ishihara, Takeyuki; Kanno, Tesuo; Kikuchi, Takahiro; Mori, Seiichi; Nobumori, Shogo; and Shirakawa, Junji, 4,929,982, Cl. 355-311.000.

Shirasaki, Yoshikazu; and Tadokoro, Yoshio, to Toyo Boseki Kabushiki Kaisha. Composite fibrous material. 4,929,503, Cl. 428-373.000.

Shirley-Fisher, David N., to NL Petroleum Products Limited. Cutting elements for rotary drill bits. 4,928,777, Cl. 175-329.000.

Shishido, Kihachi; Matsuoka, Masami; Ishihara, Noriyuki; and Tamura, Masahiro, to Showa Denko Kabushiki Kaisha; and Fuso Pharmaceutical Industries, Ltd. Medical bag. 4,929,479, Cl. 428-35.200.

Shitara, Kanji: *See*—
Ohno, Aritaka; Shitara, Kanji; and Harashima, Masakazu, 4,928,894, Cl. 242-7.090.

Shobu, Kazuhisa: *See*—
Watanabe, Tadahiko; Shobu, Kazuhisa; Kai, Yukio; Yamamoto, Hideki; Sadoh, Eiichi; Yaginhita, Osamu; and Hayakawa, Junshiro, 4,929,417, Cl. 419-12.000.

Shockey, Rick L.: *See*—
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Showa Denko Kabushiki Kaisha: *See*—
Matsui, Fumio; Suzuki, Noboru; Takaishi, Minoru; Ogura, Ryushi; Harigai, Noriaki; Hashimoto, Tadayoshi; and Uematu, Tomoe, 4,929,494, Cl. 428-286.000.
Miyazaki, Kunihiro; Ishitobi, Ken; and Yamaguchi, Yosinobu, 4,929,257, Cl. 51-309.000.

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Kitazume, Tomoya; Yamazaki, Takashi; and Rin, Seiten, 4,929,760, Cl. 568-308.000.

Shull, William; Nissen, Rudolph; and Drobshoff, Alexander, to Spectra-Physics. Heat dissipating fin and method for making fin assembly. 4,928,756, Cl. 165-182.000.

Si-Lin, Yu. Vibratory separtor screen assembly. 4,929,346, Cl. 209-323.000.

Sicignano, Albert; and Vaez-Iravani, Mehdi, to North American Philips Corporation. Focusing in instruments, such as SEMs and CRTs. 4,929,836, Cl. 250-397.000.

Sicking, Dean L.: *See*—
Buth, C. Eugene; Qureshy, Asif; Ross, Hayes E., Jr.; and Sicking, Dean L., 4,928,928, Cl. 256-13.100.

Siddle, David R.: *See*—
Massa, Ted R.; and Siddle, David R., 4,928,373, Cl. 29-278.000.

Siebourg, Wolfgang: *See*—
Dujardin, Ralf; Meyer, Rolf-Volker; and Siebourg, Wolfgang, 4,929,709, Cl. 528-198.000.

Siegel, Israel. Self cooling and self heating container. 4,928,495, Cl. 62-4.000.

Siegfried, Robert W., II, to Atlantic Richfield Company. Downhole wellbore flowmeter tool. 4,928,758, Cl. 166-66.000.

Siegfried, Robert W., II; Smith, Lonnie J.; and Cornette, H. Mitchell, to Atlantic Richfield Company. Tubing conveyed wellbore fluid flow measurement system. 4,928,759, Cl. 166-65.100.

Siemens Aktiengesellschaft: *See*—
Geiger, Gerhard; and Strafner, Michael, 4,930,103, Cl. 364-900.000.
Grasser, Franz; Reichenberger, Helmut; Hassler, Dietrich; Naser, Georg; and Schmidt, Erhard, 4,928,672, Cl. 128-24.00A.
Kantz, Dieter, 4,930,000, Cl. 357-68.000.
Kusserow, Bernd; Gagneur, Klaus; and Hofler, Siegfried, 4,930,034, Cl. 361-19.000.
Matz, Richard; and Zirrgiebel, Jutta, 4,929,515, Cl. 428-614.000.
Pfeiffer, Bernhard, 4,930,038, Cl. 361-92.000.
Reichenberger, Helmut; and Naser, Georg, 4,928,671, Cl. 128-24.00A.
Rogler, Wolfgang; Weitemeyer, Christian; Wewers, Dietmar; Zapf, Frederic; and Stapp, Bernhard, 4,929,051, Cl. 350-96.300.
Wegleiter, Walter, 4,929,300, Cl. 156-645.000.

Siemens-Bendix Automotive Electronics L.P.: *See*—
Hornby, Michael J., 4,928,729, Cl. 137-510.000.
van Vuuren, Willem N. J.; and Wakeman, Russell J., 4,928,640, Cl. 123-90.170.
Wright, Danny O.; and Wiggins, Kregg S., 4,929,879, Cl. 318-696.000.

Sigma Incorporated: *See*—
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Siliconix Incorporated: *See*—
Blanchard, Richard A., 4,929,991, Cl. 357-23.800.

Silvestrini, Jesus A., to IMDEC S.A. Method of filling drums with cooked solid food products. 4,929,459, Cl. 426-399.000.

Simmons, Gerald P.: *See*—
Lent, Kevin C.; Rife, Conwell K., Jr.; Simmons, Gerald P.; and Speck, Albert J., 4,929,121, Cl. 404-84.000.

Simmons, Kenneth E.: *See*—
Irick, Gether, Jr.; Mercer, Patricia N.; and Simmons, Kenneth E., 4,929,777, Cl. 568-864.000.

Simon, Jean-Francois: *See*—
Cozac, Daniel; and Simon, Jean-Francois, 4,929,266, Cl. 65-135.000.

Simonson, Frederick, III; and Gunn, Timothy M., to Dow Chemical Company, The. Coulometric titrator apparatus and method. 4,929,314, Cl. 204-153.230.

Simpson, Raymond W.: *See*—
Chandler, Donald G.; Nossen, Steve J.; and Simpson, Raymond W., 4,930,139, Cl. 375-1.000.

Sincholle, Daniel: *See*—
Coquelet, Claude; Roussillon, Samia; Sincholle, Daniel; Bonne, Claude; and Alazet, Alain, 4,929,635, Cl. 514-438.000.

Singer, John C., III, to Ford Motor Company. Steering column mounted transmission gear shift mechanism. 4,928,545, Cl. 74-473.0SW.

Singhdeo, Narendra N.: *See*—
Pryor, Michael J.; Fister, Julius C.; Singhdeo, Narendra N.; Mahulikar, Deepak; and Cherukuri, Satyam C., 4,929,516, Cl. 428-620.000.

Sinofsky, Edward L., to C. R. Bard, Inc. Method for closing and sealing an artery after removing a catheter. 4,929,246, Cl. 606-8.000.

Sirvet, Enn, to Sequa Corporation. Rotary cup infeed. 4,928,511, Cl. 72-361.000.

Sitch, John E., to Northern Telecom Limited. Electrostatic discharge protection circuit for an integrated circuit. 4,930,036, Cl. 361-56.000.

Sitges, Maria B.: *See*—
Possani, Lourival D. P.; Gurrola, Georgina B.; Bayon, Marco A. A. C.; and Sitges, Maria B., 4,929,718, Cl. 530-326.000.

Sizer, Theodore, II, to AT&T Bell Laboratories. Source of high repetition rate, high power optical pulses. 4,930,131, Cl. 372-18.000.

Sjoberg, Arne: *See*—
Ragnegård, Samuel; and Sjoberg, Arne, 4,929,355, Cl. 210-784.000.

Skaggs, Charles L.: *See*—
Danis, Sara L.; Skaggs, Charles L.; and Thomas, Charles A., 4,928,411, Cl. 40-324.000.

Skelley, Keith; and Skelley, William G. Golf putting practice apparatus. 4,928,975, Cl. 273-192.000.

Skelley, William G.: *See*—
Skelley, Keith; and Skelley, William G., 4,928,975, Cl. 273-192.000.

SKF France: *See*—
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Skidata Computer G.m.b.H.: *See*—
Kocznar, Wolfram; and Wallerstorfer, Kurt, 4,929,821, Cl. 235-493.000.

Slack, William F.; and Wadlington, James C., to AT&T Bell Laboratories. Method and network for enhancing power factor of off-line switching circuit. 4,930,061, Cl. 363-44.000.

Slama, Jean-Claude: *See*—
Delarue, Jean-Jacques; Patin, Michel; and Slama, Jean-Claude, 4,929,135, Cl. 411-354.000.

Slaugh, Lynn H.; Johnson, Thomas H.; and Hoxmeier, Ronald J., to Shell Oil Company. Alkylation of Benzene compounds with detergent range olefins. 4,929,584, Cl. 502-112.000.

Slezak, Raymond J., to RJS Corporation. Creel loading apparatus. 4,929,012, Cl. 294-86.410.

Slimak, Karen M. Processes for products from lotus. 4,929,467, Cl. 426-637.000.

Sliskovic, Drago R.: *See*—
Chucholowski, Alexander W.; Roth, Bruce D.; and Sliskovic, Drago R., 4,929,620, Cl. 514-269.000.

Small, James G., to Hughes Aircraft Company. Apparatus and method for transform space scanning imaging. 4,929,951, Cl. 342-179.000.

Smietana, Leo P. Method of making a conically shaped tortilla shell. 4,929,458, Cl. 426-391.000.

Smirlock, Martin E.; Ribich, William A.; Marinaccio, Paul J.; and Sawaf, Bernard E., to Foster-Miller, Inc. Survivability enhancement. 4,928,575, Cl. 89-36.020.

Smith, Charles R., to Vortab Corporation. Static fluid flow mixing apparatus. 4,929,088, Cl. 366-337.000.

Smith, Cliff A. Bluebird house. 4,928,631, Cl. 119-23.000.

Smith, Dennis E.: *See*—
Emadi, Atahusain E.; Green, Eric T.; Margosiak, John S.; Mignogna, Daniel J.; and Smith, Dennis E., 4,929,184, Cl. 439-681.000.

Smith, Donald A.; Carter, William H.; Dingfelder, Howard E.; Burgess, Dale L.; and Gates, Alan B., to Barnes Group Inc. Apparatus for making plastic leaded chip carrier connectors. 4,928,378, Cl. 29-564.600.

Smith, Edgar M., to Burle Technologies, Inc. Feedback stabilized digital infrared detector circuit. 4,929,833, Cl. 250-338.100.

Smith, Elizabeth M.: *See*—
Haslanger, Martin F.; Neustadt, Bernard R.; and Smith, Elizabeth M., 4,929,641, Cl. 514-506.000.

Smith, ernard: *See*—
Branovich, Louis E.; Smith, ernard; Freeman, Gerard L.; and Eckart Donald W., 4,929,418, Cl. 419-19.000.

Smith, Gary L. Fluid assist airless spray nozzle. 4,928,884, Cl. 239-290.000.

Smith, George R.: *See*—
Colles, Michael J.; and Smith, George R., 4,929,052, Cl. 350-96.320.

Smith, H. Kevin: *See*—
Wallace, W. Edward; Smith, H. Kevin; Lynch, W. Bryan; Craig, Raymond S.; and Pourarian, Fiaz, 4,928,496, Cl. 62-46.200.

Smith, James A.: *See*—
Burger, Christian P.; Dudderar, Thomas D.; Gilbert, John A.; Peters, Bruce R.; and Smith, James A., 4,928,527, Cl. 73-657.000.

Smith, Lonnie J.: *See*—
Siegfried, Robert W., II; Smith, Lonnie J.; and Cornette, H. Mitchell, 4,928,759, Cl. 166-65.100.

Smith, Martin D.: *See*—
Cunningham, John A.; Prestjohn, Mark O.; Reed, Bobby P.; and Smith, Martin D., 4,929,976, Cl. 354-322.000.

Smith & Nephew plc: *See*—
Sandbank, Barry M., 4,928,680, Cl. 128-155.000.

Smith, R. Arnold, to McAdory, George D. Medicaments intended for combined use in the improvement of lymphocyte function. 4,929,640, Cl. 514-474.000.

Smith, R. Scott, to Ethyl Corporation. Coupling process. 4,929,783, Cl. 585-452.000.

Smith, Raymond D.; and Marles, Robert, to GEC Plessey Telecommunications Limited. Apparatus by which auxiliary slide-in units are connected to slide-in units. 4,930,046, Cl. 361-393.000.

Smith, Thomas R.; and Tripp, Thomas M., to Pyramid, Inc. Connectable belt and method for forming same. 4,929,222, Cl. 474-255.000.

Smuda, Hubert; Hoelderich, Wolfgang; Goetz, Norbert; and Recker, Hans-Gert, to BASF Aktiengesellschaft. Preparation of phenylacetaldehydes. 4,929,765, Cl. 568-427.000.

Smulders, Eduard: *See*—
Schulz, Paul; Schwadtke, Karl; and Smulders, Eduard, 4,929,380, Cl. 252-121.000.

Snavely, Donald E. Color organ display device. 4,928,568, Cl. 84-464.00R.

Snelgrove, R. Vernon: *See*—
Cipriano, Robert A.; Snelgrove, R. Vernon; and McCullough, Francis P., Jr., 4,929,521, Cl. 429-102.000.

Snodell, W. S., to Peerless Industries, Inc. Tiltable mounting bracket. 4,928,914, Cl. 248-274.000.

Snow, George: *See*—
Butler, David R.; Snow, George; Sandford, Philip; Neu, Max G.; Villani, Jean P.; Teyssedre, Alain; and Lenoir, Roland, 4,928,746, Cl. 164-362.000.

Societe Anonyme des Machines Osborn: *See*—
Brigolle, Roger, 4,929,087, Cl. 366-111.000.
Societe Anonyme dite : Alcatel CIT: *See*—
Abaziou, Jean-Luc; Billy, Jean-Claude; and Le Mouel, Bernard, 4,930,127, Cl. 370-110.400.
Long, Jacques; and Perrillat-Amede, Denis, 4,929,151, Cl. 415-177.000.
Societe Anonyme dite: Alcatel Thomson Faisceaux Hertziens: *See*—
Begout, Eric; Bourgeois, Alain; Gueuret, Raymond; and Lapeyre, Pascal, 4,929,962, Cl. 343-786.000.
Societe Anonyme dite: Compagnie Generale D'Electricite: *See*—
Dubots, Patrick; Legat, Denis; and Vic, Raymond, 4,929,047, Cl. 350-96.230.
S.A. Ets. R. Heinen N.V.: *See*—
Heinen, Hans-Dieter, 4,929,005, Cl. 292-251.500.
S.A.: Societe Europeenne de Propulsion: *See*—
Fouche, Claude, 4,928,561, Cl. 82-1.110.
Societe Europeenne de Propulsion: *See*—
Girault, Jean-Philippe, 4,929,158, Cl. 417-405.000.
Societe Jacques DuBois: *See*—
Brandener, Louis, 4,928,998, Cl. 285-49.000.
Societe Nationale d'Etude et de Construction de Moteurs d'Aviation (SNECMA): *See*—
LeFort, Bernard; Maulat, Jean-Pierre; and Bachomoff, Guy R., 4,928,483, Cl. 60-226.100.
Soderberg, Terje; Sodersteen, Rolf; and Toreman, Ulrik, to Plockmatic International AB. Sheet collating machine with automatic double feed prevention. 4,928,945, Cl. 271-9.000.
Sodersteen, Rolf: *See*—
Soderberg, Terje; Sodersteen, Rolf; and Toreman, Ulrik, 4,928,945, Cl. 271-9.000.
Soemers, Hermanus M. J. R.: *See*—
Koster, Marinus P.; Van Der Hoek, Willem; Kemper, Nicolaas R.; and Soemers, Hermanus M. J. R., 4,929,146, Cl. 414-744.500.
Softspot, Inc.: *See*—
Resnick, Susan D.; and Nuyens, Angela M., 4,929,211, Cl. 446-14.000.
Sohner, Gerhard; Roth, Helmut; Brammer, Hartmut; Schleupen, Richard; and Nubel, Karl-Heinz, to Robert Bosch GmbH. Protective case for combination ignition coil and electronic control. 4,928,660, Cl. 123-647.000.
Solar, Jeffrey P.: *See*—
Hegedus, Louis; Beeckman, Jean W.; Pan, Wie-Hin; and Solar, Jeffrey P., 4,929,586, Cl. 502-217.000.
Soles, Thomas D., Jr. Alignment system. 4,928,971, Cl. 273-164.000.
Solinst Canada Limited: *See*—
Toon, Donald A.; and Belshaw, Douglas J., 4,928,541, Cl. 73-864.630.
Solvay & Cie (Societe Anonyme): *See*—
Legrand, Franz; Lerot, Luc; and De Bruycker, Patricia, 4,929,436, Cl. 423-593.000.
Sommer, Hans D., to Steyr-Daimler-Puch AG. Motor vehicle comprising two driven axles. 4,928,782, Cl. 180-244.000.
Son, Pyong N.: *See*—
Kletecka, George; Lai, John T.; and Son, Pyong N., 4,929,653, Cl. 524-96.000.
Sonoi, Takehiro; and Yamada, Okimasa, to Nippon Mektron Ltd. Fluorine-containing elastomer composition. 4,929,686, Cl. 525-279.000.
Sony Corporation: *See*—
Fujita, Tadao, 4,930,012, Cl. 358-105.000.
Maeda, Satoru; Noguchi, Yasuhi; Yasuda, Kazunori; and Takano, Shyunsuke, 4,930,014, Cl. 358-209.000.
Suzuki, Kiyosuke; and Wanami, Hideki, 4,930,008, Cl. 358-75.000.
Yamamoto, Yoshihiro; Saito, Junya; and Suzuki, Masakazu, 4,930,004, Cl. 358-29.000.
Sorbello, Robert M.; Effland, John E.; and Zaghloul, Amir I., to Communications Satellite Corporation. Dual-polarized printed circuit antenna having its elements capacitively coupled to feedlines. 4,929,959, Cl. 343-700.0MS.
Sorenson, Richard W., to Carlingswitch, Inc. Miniature illuminated rocker switch and case therefore. 4,929,807, Cl. 200-296.000.
Sorlien, Mark D.: *See*—
Deziel, Edward W.; Rueb, John T.; Sorlien, Mark D.; Dahlstrom, Jack A.; and Erismann, David W., 4,929,029, Cl. 300-21.000.
Source Technology Earth Oils, Inc.: *See*—
Thirumalachar, M. Jeersannidhi; and Narasimhan, M. Jeersannidhi, Jr., 4,929,341, Cl. 208-390.000.
South Carolina State Ports Authority: *See*—
Franks, Jerry L., 4,928,790, Cl. 182-3.000.
Sowman, Harold G., to Minnesota Mining and Manufacturing Company. Refractory fibers of alumina and organic residue. 4,929,578, Cl. 501-95.000.
Spademan, Richard G. Shoe dynamic fitting system. 4,928,405, Cl. 36-50.000.
Spak, Mark A.; Mammato, Donald; Durham, Dana; and Jain, Sangya, to Hoechst Celanese Corporation. Image reversal negative working O-napthoquinone diazide and cross-linking compound containing photoresist process with thermal curing. 4,929,536, Cl. 430-325.000.
Spalding, Keith A.: *See*—
Kalra, Varinder K.; and Spalding, Keith A., 4,929,921, Cl. 337-233.000.
Spar Aerospace Limited: *See*—
Mee, Francis H. A., 4,929,136, Cl. 411-432.000.
Speck, Albert J.: *See*—
Lent, Kevin C.; Rife, Conwell K., Jr.; Simmons, Gerald P.; and Speck, Albert J., 4,929,121, Cl. 404-84.000.
Spector, George: *See*—
Harder, Leroy; and Spector, George, 4,928,601, Cl. 104-53.000.
Spectra-Physics: *See*—
Shull, William; Nissen, Rudolph; and Drobshoff, Alexander, 4,928,756, Cl. 165-182.000.
Speer, Stephen R., to Nautical Development, Inc. Self-actuating variable pitch marine propeller. 4,929,153, Cl. 416-46.000.
Speraw, Floyd G.: *See*—
Wong, Daniel T.; and Speraw, Floyd G., 4,929,185, Cl. 439-74.000.
Sperry Marine, Inc.: *See*—
Baldwin, Chris J., 4,929,943, Cl. 340-984.000.
Spettel, Gary: *See*—
Westimayer, Anthony J.; and Spettel, Gary, 4,928,793, Cl. 182-187.000.
Spies, Brian R., to Atlantic Richfield. Transient electromagnetic method for detecting irregularities on conductive containers. 4,929,898, Cl. 324-242.000.
Spirotron Corporation: *See*—
Woods, William A., 4,928,625, Cl. 118-323.000.
Spitzmesser, Jonathan B.: *See*—
Doty, Francis D.; and Spitzmesser, Jonathan B., 4,928,755, Cl. 165-168.000.
SPS Technologies, Inc.: *See*—
Bogatin, Yakov, 4,929,275, Cl. 75-246.000.
Sredni, Benjamin; Pavliv, Leo; and Albeck, Michael, to Bar-Ilan University. Complexes of tellurium and selenium derivatives. 4,929,739, Cl. 549-347.000.
SRI International: *See*—
Void, Barbara S., 4,929,544, Cl. 435-6.000.
Staat, Karlhans; and Moltner, Hermann, to Kocks Technik GmbH & Co. Methods and apparatus for manufacturing seamless tube. 4,928,507, Cl. 72-38.000.
STAC, Inc.: *See*—
Whiting, Douglas L.; and George, Glen A., 4,930,142, Cl. 375-120.000.
Staedtler & Uhl: *See*—
Egerer, Josef, 4,928,356, Cl. 19-129.00R.
Staheli, Paul: *See*—
Demuth, Robert; Staheli, Paul; Waber, Rene; Grundler, Christoph; and Machler, Franz, 4,928,353, Cl. 19-65.00A.
Stainton, John E.: *See*—
Dunkley, Michael W.; and Stainton, John E., 4,930,078, Cl. 364-424.100.
Dunkley, Michael W.; and Stainton, John E., 4,930,081, Cl. 364-424.100.
Stamicarbon B.V.: *See*—
Okada, Takuji; and Murakami, Kunio, 4,929,501, Cl. 428-337.000.
Standard Oil Company, The: *See*—
Cesa, Mark C.; Dubbert, Robert A.; and Burrington, James D., 4,929,755, Cl. 562-443.000.
Gupta, Victor R.; and Clark, Christopher J., 4,929,789, Cl. 585-648.000.
Stanislawczyk, Vic, to B.F. Goodrich Company, The. Nonwoven fabric coated with carboxylated acrylate polymers, and process for making the nonwoven fabric. 4,929,495, Cl. 428-288.000.
Stapp, Bernhard: *See*—
Rogler, Wolfgang; Weitemeyer, Christian; Wewers, Dietmar; Zapf, Frederic; and Stapp, Bernhard, 4,929,051, Cl. 350-96.300.
State University of New York: *See*—
Ruckenstein, Eli; and Chung, Dennis B., 4,929,510, Cl. 428-520.000.
Staudner, Janet L.: *See*—
Staudner, Rupert A., 4,928,421, Cl. 43-36.000.
Staudner, Rupert A., to Staudner, Janet L. Fishhook device and method of making same. 4,928,421, Cl. 43-36.000.
Steele, Duane F.; Warman, Eugene C.; and Hutter, Robert J., to Ford Motor Company. Pulsation damper for air conditioning compressor. 4,929,157, Cl. 417-312.000.
Steele, John, to T K Valve Limited. Ball valves for pipelines. 4,928,921, Cl. 251-175.000.
Steele, Robert B.; and Pasdera, Leonard A., to Ampex Corporation. Method and apparatus for tape speed override operation when recovering helical audio. 4,930,027, Cl. 360-70.000.
Steenbergen, Bastiaan G.; Hofman, Arie A.; and De Waard, Willem, to Digging Trading Company N.V. Method for installing a screen of flexible material in the soil. 4,929,126, Cl. 405-267.000.
Steffens, Robert: *See*—
Lindner, Werner; Becker, Benedikt; Steffens, Robert; Wachendorff-Neumann, Ulrike; Brandes, Wilhelm; Stendel, Wilhelm; and Dutzmann, Stefan, 4,929,642, Cl. 514-510.000.
Steffes, Helmut: *See*—
Reinartz, Hans-Dieter; and Steffes, Helmut, 4,929,038, Cl. 303-119.000.
Steidele, Thomas: *See*—
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Stein, Ludwig: *See*—
Mahlkow, Hartmut; Romer, Michael; Rosskamp, Gunther; Seidenspinner, Hubert-Matthias; Stein, Ludwig; and Strache, Waltraud, 4,929,422, Cl. 427-57.000.
Steingold, Harold: *See*—
Richardson, Larie; and Steingold, Harold, 4,928,891, Cl. 247-41.000.

Steinkuhle, Ferdinand; Strate, Klaus; Durkop, Willi; and Moller, Ulrich, to C. A. Weidmuller GmbH & Co. Circuit board terminal assembly. 4,929,186, Cl. 439-78.000.

Steinwandel, Juergen; Haas, Juergen; and Plog, Carsten, to Dornier-System GmbH. Catalytic diesel soot filter. 4,929,581, Cl. 502-2.000.

Stelly, Mark. Expandable goose decoy. 4,928,418, Cl. 43-3.000.

Stendel, Wilhelm: *See*—
Lindner, Werner; Becker, Benedikt; Steffens, Robert; Wachendorff-Neumann, Ulrike; Brandes, Wilhelm; Stendel, Wilhelm; and Dutzmann, Stefan, 4,929,642, Cl. 514-510.000.

Stenger, Claudia V.; and Huang, Shu-Jen W., to Nalco Chemical Company. Cationic coagulants plus colloidal silica for use in paint detackification. 4,929,382, Cl. 252-181.000.

Stepanenko, Alexandr V.: *See*—
Kljuev, Vladimir V.; Kozlov, Valery S.; Volodchenko, Dmitry B.; Stepanenko, Alexandr V.; Baranovsky, Vladimir I.; Korolkov, Mikhail I.; and Semenov, Orest S., 4,930,026, Cl. 360-67.000.

Stephani, Trutz-Ulrich; Mohr, Dieter; Maisel, Britta; and Frass, Werner, to Hoechst Aktiengesellschaft. Positive-working photosensitive mixture and photolithographic copying material produced therefrom with o-quinone dialide sulfonyl ester and azo coupler. 4,929,534, Cl. 430-191.000.

Stephens, Howard P.: *See*—
Dosch, Robert G.; and Stephens, Howard P., 4,929,582, Cl. 502-11.000.

Stephenson, James G.; and Huggett, Mark D., to Progressive Dynamics, Inc. Snap-on frame for light fixtures. 4,930,056, Cl. 362-364.000.

Stergiopoulos, Stergios: *See*—
Sullivan, Edmund J.; and Stergiopoulos, Stergios, 4,930,111, Cl. 367-130.000.

Stevens, James C.: *See*—
Wilson, David R.; and Stevens, James C., 4,929,699, Cl. 525-339.000.

Stevens, Robert L.: *See*—
Bell, Michael G.; and Stevens, Robert L., 4,928,939, Cl. 269-309.000.

Stevenson, George F.; Foote, James C.; and Hamlin, Humphrey A. S., to Normalair-Garrett (Holdings) Limited. Aircraft on-board oxygen generating systems. 4,928,682, Cl. 128-202.260.

Stewart Warner Instrument Corporation: *See*—
Weaver, Frank C., 4,928,526, Cl. 73-313.000.

Steyr-Daimler-Puch AG: *See*—
Sommer, Hans D., 4,928,782, Cl. 180-244.000.
Zedrosser, Ulrich, 4,928,597, Cl. 102-430.000.

Stielow, Erwin H. Ratchet wrench. 4,928,559, Cl. 81-63.000.

Stierle, Andrea C.: *See*—
Cardellina, John H., II; Stierle, Andrea C.; and Strobel, Gary A., 4,929,270, Cl. 71-92.000.

Stoecklein, Walter. Crypt insulation panel and method of installation. 4,928,447, Cl. 52-136.000.

Stoll, Kurt. Piston and cylinder unit. 4,928,577, Cl. 92-177.000.

Storage Technology Corporation: *See*—
O'Brien, John T.; Thomas, Neil L.; and Dyer, Tracy D., 4,929,946, Cl. 341-87.000.

Stork Amsterdam B.V.: *See*—
Hermans, Willem F., 4,929,152, Cl. 415-203.000.

Stork Brabant B.V.: *See*—
van Mondfrans, Gerardus H.; and de Vries, Pieter, 4,928,585, Cl. 101-129.000.

Stork Contiweb B.V.: *See*—
Jacobs, Thomas G. M.; and De Vroome, Clemens J. M., 4,929,173, Cl. 431-215.000.

Stork PMT B.V.: *See*—
van den Nieuwelaar, Adrianus J.; and Janssen, Petrus C. H., 4,928,351, Cl. 17-11.000.

Strache, Waltraud: *See*—
Mahlkow, Hartmut; Romer, Michael; Rosskamp, Gunther; Seidenspinner, Hubert-Matthias; Stein, Ludwig; and Strache, Waltraud, 4,929,422, Cl. 427-57.000.

Strafner, Michael: *See*—
Geiger, Gerhard; and Strafner, Michael, 4,930,103, Cl. 364-900.000.

Strate, Klaus: *See*—
Steinkuhle, Ferdinand; Strate, Klaus; Durkop, Willi; and Moller, Ulrich, 4,929,186, Cl. 439-78.000.

Strate, Rudiger; Schulze, Rainer; Schnatwinkel, Michael; Wagner, Georg; Wilmes, Manfred; Haller, Bernd; Herkner, Ernst; Diekmann, Jorg; and Henning, Herbert, to C. A. Weidmuller GmbH & Co. Conductor connection assembly. 4,929,198, Cl. 439-709.000.

Strekowski, Lucjan; Mokrosz, Maria; and Harden, Donald B., to Georgia State University Foundation, Inc. Novel diazines and their method of preparation. 4,929,726, Cl. 544-122.000.

Strobel, Gary A.: *See*—
Cardellina, John H., II; Stierle, Andrea C.; and Strobel, Gary A., 4,929,270, Cl. 71-92.000.

Stuhler, Robert H.: *See*—
Fredrick, William R.; and Stuhler, Robert H., 4,928,927, Cl. 254-279.000.

Sturm, Richard, to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung. Remote control system for a rolling flying body. 4,928,906, Cl. 244-3.220.

Su, Kai C.: *See*—
Hung, William M.; and Su, Kai C., 4,929,250, Cl. 8-507.000.

Subbanna, Somanahalli N.: *See*—
Boghean, Barry J.; Subbanna, Somanahalli N.; Redmon, Charles L., and Wamser, Christian A., 4,929,435, Cl. 423-484.000.

Sublett, Bobby J.: *See*—
Trotter, Jimmy R.; and Sublett, Bobby J., 4,929,714, Cl. 528-272.000.

Subramanian, Munirpallam A.: *See*—
Gopalakrishnan, Jagannatha; and Subramanian, Munirpallam A., 4,929,594, Cl. 505-1.000.

Suchdev, Lakhbir S.: *See*—
Gassen, James R.; and Suchdev, Lakhbir S., 4,928,390, Cl. 30-123.400.

Sudoh, Eiichi: *See*—
Watanabe, Tadahiko; Shobu, Kazuhisa; Kai, Yukio; Yamamoto, Hideki; Sudoh, Eiichi; Yagishita, Osamu; and Hayakawa, Junshiro, 4,929,417, Cl. 419-12.000.

Sudolnik, James M.; and Prince, Stephen R., to General Electric Company. Steam valve with variable actuation forces. 4,928,733, Cl. 137-630.130.

Sue, Jiinjen A.; and Troue, Harden H., to Union Carbide Corporation. Apparatus and process for arc vapor depositing a coating in an evacuated chamber. 4,929,322, Cl. 204-192.380.

Suehiro, Junji: *See*—
Saigo, Akira; Maezawa, Shigenari; Kageyama, Tomoaki; Ishikura, Keizaburo; Sera, Akio; and Suehiro, Junji, 4,929,903, Cl. 324-544.000.

Sueoka, Yuuji: *See*—
Suzuki, Shuuji; Moriyama, Kenzo; and Sueoka, Yuuji, 4,930,128, Cl. 371-12.000.

Suga, Yozo: *See*—
Komatsu, Hajime; Tanino, Mitsuru; Suga, Yozo; and Konno, Toyohiko, 4,929,286, Cl. 148-111.000.

Suganuma, Kazushi: *See*—
Kobayashi, Kenzo; Iwagaki, Yutaka; Hasegawa, Mitsuyo; and Suganuma, Kazushi, 4,930,119, Cl. 370-16.100.

Suganuma, Yoshimi: *See*—
Oshikoshi, Yuji; Suganuma, Yoshimi; Hara, Hiroshi; Shiota, Kazuo; Takehara, Nobumitsu; and Sakamoto, Kiichiro, 4,928,996, Cl. 283-109.000.

Sugi, Tokio; Mori, Yasuo; and Takahashi, Yugi, to Tokyo Keiso Co., Ltd. Method and apparatus for measuring flow rate of a gas containing condensable components and mists. 4,928,524, Cl. 73-200.000.

Sugihara, Kanji; Yamamoto, Motohiro; Kida, Tohru; and Fukazawa, Minoru, to Tokai Carbon Co., Ltd. Surface-coated SiC whiskers, processes for preparing the same, ceramic reinforced with the same, and process for preparing said reinforced ceramic. 4,929,472, Cl. 427-215.000.

Sugihara, Shigeru, to NEC Corporation. Frame-interval fault detection in a demand assignment TDMA communication system. 4,930,118, Cl. 370-16.000.

Sugihara, Tadashi: *See*—
Takeshita, Takuo; Sugihara, Tadashi; and Fujino, Shuichi, 4,929,597, Cl. 505-1.000.

Sugihara, Takashi; Uda, Kazutaka; Tabuchi, Hiroki; Inami, Yasuhiko; Hijikigawa, Masaya; and Kataoka, Shoei, to Sharp Kabushiki Kaisha. Sensor. 4,928,513, Cl. 73-1.00G.

Sugimoto, Mansaku: *See*—
Yoshinaka, Minoru; Matsuo, Koujirou; Koike, Kiichi; Suzuki, Yoshie; and Sugimoto, Mansaku, 4,929,518, Cl. 429-54.000.

Sugimoto, Nsoahige; Yoshida, Tetsushi; and Toyama, Tadahisa, to Casio Computer Co., Ltd. Color liquid crystal display device. 4,929,060, Cl. 350-339.00F.

Sugisaki, Tsutomu: *See*—
Miyoshi, Takahito; Kanazawa, Minoru; Sugisaki, Tsutomu; Yamada, Takuzi; and Okuzawa, Yasutoshi, 4,930,032, Cl. 360-132.000.

Sugita, Hiroshi: *See*—
Sato, Ryosuke; Kato, Katsunori; Sasaki, Takashi; and Sugita, Hiroshi, 4,929,539, Cl. 430-353.000.

Sugiura, Susumu; Kouzato, Yasuo; and Masuda, Yukio, to Canon Kabushiki Kaisha. Digital color image processing method and apparatus for discriminating high resolution areas of a color image signal and controlling image processing in accordance with the discrimination. 4,930,007, Cl. 358-75.000.

Sugiyama, Isao: *See*—
Machida, Yoshimasa; Negi, Shigeto; Kamiya, Takashi; Komatu, Yuuki; Sugiyama, Isao; Kai, Yasunobu; Nakamura, Takaharu; Naito, Toshihiko; Kitoh, Kyosuke; Katsu, Kanemasa; and Yamauchi, Hiroshi, 4,929,612, Cl. 514-202.000.

Sugiyama, Noriyuki; and Mochizuki, Mitsuhiro, to Polyplastics Co., Ltd. Polyacetal resin composition. 4,929,712, Cl. 528-230.000.

Sugiyama, Takao: *See*—
Sawai, Kiichi; Kurono, Masayasu; Asai, Hiromiotu; Mitani, Takahiko; Ninomiya, Naohisa; Sugiyama, Takao; Furukawa, Eiji; and Michishita, Hisashi, 4,929,438, Cl. 424-10.000.

Sugiyama, Tsutomu, to Fujitsu Limited; and Fujitsu VLSI Limited. Semiconductor memory device with serial access memory. 4,930,108, Cl. 365-230.020.

Sugiyama, Yoshihiro: *See*—
Muto, Shunichi; Inata, Tsuguo; Takeuchi, Atsushi; and Sugiyama, Yoshihiro, 4,929,984, Cl. 357-4.000.

Suling, Carlhans: *See*—
Bachem, Henning; Suling, Carlhans; Muszik, Janos; and Schroer, Wolf-Dieter, 4,929,309, Cl. 162-164.300.

Sullivan, Edmund J.; and Stergiopoulos, Stergios, to United States of America, Navy. Overlap correlator synthetic aperture processor. 4,930,111, Cl. 367-130.000.

Sullivan, Edward V.: *See*—
Leib, Kenneth G.; and Sullivan, Edward V., 4,929,056, Cl. 350-321.000.

Sullivan, John L.: *See*—
Bachelder, Walter F.; Sullivan, John L.; Fiore, Peter J.; and Hansen, Godfrey L., 4,928,533, Cl. 73-838.000.

Sullivan, Michael J. Straightening device for flexible tubular structures. 4,928,669, Cl. 128-4.000.

Sulzer Brothers Limited: *See*—
Hanselmann, Daniel; and Schlepfer, Walter, 4,928,354, Cl. 19-97.000.

Sumitomo Chemical Company, Ltd.: *See*—
Abe, Hiroomi; Niahio, Taichi; Suzuki, Yasurou; Sanada, Takashi; and Tsuji, Mitsuji, 4,929,675, Cl. 525-66.000.
Kitayama, Shinichiro; Adachi, Teruho; Ueda, Masahiro; Aoki, Yuichi; Shiiki, Satoshi; Takigawa, Akio; Yoshida, Motoaki; Imamura, Naoya; Maeda, Koichi; and Kayanoki, Hisayuki, 4,929,523, Cl. 430-4.000.

Sumitomo Electric Industries, Ltd.: *See*—
Nishimura, Yoshifumi; Yamamoto, Susumu; Nakata, Hidekazu; Muraoka, Kiyoshige; Uchida, Mamoru; and Taguchi, Takafumi, 4,929,512, Cl. 428-610.000.

Sumitomo Rubber Industries, Ltd.: *See*—
Hamada, Akihiko; Hiraoka, Hidenori; Nakamura, Yoshinobu; and Ohtsuru, Hiroshi, 4,929,678, Cl. 525-193.000.
Nishimura, Yoshifumi; Yamamoto, Susumu; Nakata, Hidekazu; Muraoka, Kiyoshige; Uchida, Mamoru; and Taguchi, Takafumi, 4,929,512, Cl. 428-610.000.
Oku, Masahiro; and Iwamura, Kazumitsu, 4,928,742, Cl. 152-534.000.
Yamaguchi, Tetsuo; and Matsushita, Hiroomi, 4,928,965, Cl. 273-78.000.

Summer, Steven E., to Powr-Ups Corporation. Luminaire system. 4,929,873, Cl. 315-219.000.

Sun, Mingui: *See*—
Sekhar, Laligam N.; Scalbassi, Robert J.; Sun, Mingui; and Wasserman, Jacob F., 4,928,705, Cl. 128-773.000.

Sun, Yun C.: *See*—
Laughner, Michael K.; Lancaster, Gerald M.; and Sun, Yun C., 4,929,673, Cl. 525-63.000.

Sundstrand Corporation: *See*—
Carlson, William E.; and Metzler, Mark W., 4,930,045, Cl. 361-329.000.
Shekleton, Jack R.; Rodgers, Colin; and Archibald, John P., 4,928,479, Cl. 60-39.360.

Sundstrand Data Control, Inc.: *See*—
Davidson, Charles W., 4,929,957, Cl. 342-410.000.
Hulsing, Rand H., II; and Novack, Mitchell, 4,929,860, Cl. 310-366.000.

Superstream, Inc.: *See*—
Greenspan, Alexander, 4,929,149, Cl. 415-99.000.

Supra Products, Inc.: *See*—
Henderson, Walter G.; Ellson, George A.; and Unrein, Edgar J., 4,929,880, Cl. 320-30.000.

Suruga, Eihiro: *See*—
Takata, Hirotoshi; Suruga, Eihiro; and Inoue, Gentei, 4,929,098, Cl. 384-450.000.

Suskind, Stuart P.; and Miller, Joseph H., to James River Corporation of Virginia. Engineered-pulp wet wiper fabric. 4,929,498, Cl. 428-288.000.

Suto, Kenichiro: *See*—
Egashira, Noritaka; Suto, Kenichiro; and Muro, Atsushi, 4,929,591, Cl. 503-227.000.

Suwa, Toshio; Kobayashi, Nobuaki; and Hirano, Takashi, to Nippon Sanso Kabushiki Kaisha. Oxygen heater, hot oxygen lance having an oxygen heater and pulverized solid fuel burner. 4,928,605, Cl. 110-261.000.

Suzuki, Akinori; Hyeon, Suong B.; Kajita, Toshio; Furushima, Masakazu; Yoshinaka, Shigeo; Suzuki, Takashi; Oda, Mitsunori; and Tanaka, Akinori, to Mitsubishi Gas Chemical Company. Plant growth promotion. 4,929,267, Cl. 71-77.000.

Suzuki, Akira: *See*—
Aoki, Masakazu; and Suzuki, Akira, 4,929,161, Cl. 418-83.000.

Suzuki, Fumitoshi: *See*—
Akita, Shuichi; Suzuki, Fumitoshi; Kikuchi, Yasushi; and Oishi, Hideyuki, 4,929,679, Cl. 525-194.000.

Suzuki, Hideo: *See*—
Kudo, Masaki; and Suzuki, Hideo, 4,928,569, Cl. 84-626.000.

Suzuki Jidosha Kogyo Kabushiki Kaisha: *See*—
Ohmura, Yukihiro; Kobayashi, Yoshiyuki; Hosoi, Keiji; and Shimoda, Kazuharu, 4,928,659, Cl. 123-588.000.

Suzuki, Kiyosuke; and Wanami, Hideki, to Sony Corporation. Scanner for reading color image. 4,930,008, Cl. 358-75.000.

Suzuki, Masahiko, deceased: *See*—
Yasuda, Hiroshi; and Suzuki, Masahiko, deceased, 4,929,838, Cl. 250-492.200.

Suzuki, Masakazu: *See*—
Yamamoto, Yoshihiro; Saito, Junya; and Suzuki, Masakazu, 4,930,004, Cl. 358-29.000.

Suzuki, Noboru: *See*—
Marui, Fumio; Suzuki, Noboru; Takaishi, Minoru; Ogura, Ryushi; Harigai, Noriaki; Hashimoto, Tadayoshi; and Uematu, Tomoe, 4,929,494, Cl. 428-286.000.

Suzuki, Shuuji; Moriyama, Kenzo; and Sueoka, Yuuji, to Hitachi, Ltd. Method for restart of online computer system and apparatus for carrying out the same. 4,930,128, Cl. 371-12.000.

Suzuki, Takahiko: *See*—
Kageyama, Shuhei; Suzuki, Takahiko; and Yamagishi, Yuichi, 4,929,107, Cl. 401-65.000.

Suzuki, Takashi; and Amemiya, Hideto, to Nittan Company. Fire detector having a protective cover. 4,929,093, Cl. 374-208.000.

Suzuki, Takashi: *See*—
Suzuki, Akinori; Hyeon, Suong B.; Kajita, Toshio; Furushima, Masakazu; Yoshinaka, Shigeo; Suzuki, Takashi; Oda, Mitsunori; and Tanaka, Akinori, 4,929,267, Cl. 71-77.000.

Suzuki, Takeshi: *See*—
Abe, Shinya; Miyamoto, Mitsuaki; Tanaka, Masayuki; Akasaka, Kozo; Hayashi, Kenji; Kawahara, Tetsuya; Katayama, Satoshi; Sakuma, Yoshinori; Suzuki, Takeshi; and Yamatsu, Isao, 4,929,623, Cl. 514-293.000.

Suzuki, Tomonari: *See*—
Yoshida, Masaru; Yoshikawa, Mitsuhiko; Yoshimoto, Yoshikazu; Wada, Hiroshi; Suzuki, Tomonari; and Nakajima, Shigeo, 4,929,803, Cl. 174-117.00M.

Suzuki, Tomoyuki: *See*—
Nagahara, Shinichi; Suzuki, Tomoyuki; Yamada, Tomoyasu; Takahashi, Tokihiro; and Miyake, Ichiro, 4,930,031, Cl. 360-107.000.

Suzuki, Toshitake;; Komoda, Norio; Oda, Susumu; and Harata, Motoo, to Toyota Jidosha Kabushiki Kaisha. Piezoelectric actuator having parallel arrangement of a single piezoelectric element and a pair of displacement magnification arms. 4,929,859, Cl. 310-328.000.

Suzuki, Yasoji: *See*—
Matsumoto, Osamu; Maruyama, Tadashi; Murata, Hiroyoshi; Abe, Isao; Shigematsu, Tomohisa; Shinada, Kazuyoshi; Suzuki, Yasoji; and Kobayashi, Ichiro, 4,930,105, Cl. 365-185.000.

Suzuki, Yasurou: *See*—
Abe, Hiroomi; Nishio, Taichi; Suzuki, Yasurou; Sanada, Takashi; and Tsuji, Mitsuji, 4,929,675, Cl. 525-66.000.

Suzuki, Yohei: *See*—
Kursuchi, Makoto; Hashimoto, Michio; Hayasaki, Kiyoshi; Minami, Toshikazu; Ohnishi, Mutsuhiko; and Suzuki, Yohei, 4,929,650, Cl. 523-455.000.

Suzuki, Yoshie: *See*—
Yoshinaka, Minoru; Matsuo, Koujirou; Koike, Kiichi; Suzuki, Yoshie; and Sugimoto, Mansaku, 4,929,518, Cl. 429-54.000.

Suzuki, Yoshikazu, Fumie Suzuki, heirs: *See*—
Yasuda, Hiroshi; and Suzuki, Masahiko, deceased, 4,929,838, Cl. 250-492.200.

Suzuki, Yutaka, to Nissan Motor Co., Ltd. Control arrangement for automatic transmission. 4,930,080, Cl. 364-424.100.

Svyatsky, Eduard; Loftis, Jerry W.; and Faber, Thomas, to Bell & Howell Company. Vertical feed mechanism for documents. 4,928,946, Cl. 271-10.000.

Svyatsky, Eduard, to Bell & Howell Co. Mechanical document feed apparatus. 4,928,952, Cl. 271-150.000.

Swadell, Robert A., to Geisha Corporation. Marker lamp with halo effect. 4,930,055, Cl. 362-244.000.

Swanson, Richard D.: *See*—
Weixelman, Lawrence M.; and Swanson, Richard D., 4,929,899, Cl. 324-253.000.

Swanson, Tad: *See*—
Henderson, Don J.; Brady, Robert; Gamble, Foster R.; Hardt, James V.; Friedfeld, Howard; Salerno, Don; Swanson, Tad; and Sansing, Maureen R., 4,928,696, Cl. 128-644.000.

Swarts, Richard E.: *See*—
Wiegand, Walter J.; Swindal, James L.; Swarts, Richard E.; Bullis, Robert H.; Lopiccolo, Mario T.; Grantham, Daniel H.; and Foyt, Arthur G., 4,930,042, Cl. 361-280.000.

Swartz, Louis D.: *See*—
Yaniv, Zvi; Cannella, Vincent D.; Hansell, Gregory L.; and Swartz, Louis D., 4,929,569, Cl. 437-51.000.

Sweeney, Niall; and Gyure, Sandor, to Becton, Dickinson and Company. Syringe having tamper evidence features. 4,929,232, Cl. 604-111.000.

Swenson, Julius A. Device for stopping the spillage of popcorn. 4,928,842, Cl. 220-85.00R.

Swidwa, Kenneth J.: *See*—
Kaufmann, John W.; Swidwa, Kenneth J.; and Hornak, Leonard P., 4,929,413, Cl. 376-268.000.

Swihart, Terence J.: *See*—
Fillmore, Danielle M.; Price, John G.; and Swihart, Terence J., 4,929,691, Cl. 525-477.000.
Narula, Dipak B.; Be, Anh; and Swihart, Terence J., 4,929,703, Cl. 528-23.000.

Swindal, James L.: *See*—
Wiegand, Walter J.; Swindal, James L.; Swarts, Richard E.; Bullis, Robert H.; Lopiccolo, Mario T.; Grantham, Daniel H.; and Foyt, Arthur G., 4,930,042, Cl. 361-280.000.

Swisher, David R., to Sherwood Medical Company. Baffle system for use in underwater drainage devices. 4,929,244, Cl. 604-319.000.

Swisher, George W., Jr., to CMI Corporation. Apparatus and method for producing cold mix asphalt. 4,928,890, Cl. 241-24.000.

Sylvester, Gerd: *See*—
Meurer, Kurt P.; Waniczek, Helmut; Sylvester, Gerd; and Witte, Josef, 4,929,689, Cl. 525-333.900.

Sylvester, Judith M.: *See*—
Vincent, Gary A.; Sylvester, Judith M.; and Vincent, Harold L., 4,929,376, Cl. 252-62.560.

Symon, Georg, to Maschinenfabrik Rieter AG. Traversing apparatus for traversing a longitudinally moving yarn which is to be wound up throughout a traversing stroke. 4,928,896, Cl. 242-43.00R.

Synergistics Industries, Limited: *See*—
Gupta, Ved P.; and DuPont, Louis A., 4,929,749, Cl. 560-79.000.

Syntex (U.S.A.) Inc.: *See*—
Castelhano, Arlindo L.; DeYoung, Lawrence M.; Krantz, Alexander; Pliura, Diana H.; and Venuti, Michael C., 4,929,630, Cl. 514-380.000.
Cooper, Gary F., 4,929,740, Cl. 549-415.000.

Synthelabo: *See*—
Manoury, Philippe; and Saarmets, Alfred, 4,929,621, Cl. 514-275.000.

Szepesi, Tamas S., to National Semiconductor Corporation. Apparatus for converting DC to DC having non-feed back variable hysteretic current-mode control for maintaining approximately constant frequency. 4,929,882, Cl. 323-222.000.

Szlucha, Thomas F.: *See*—
Barton, Arthur A.; DeBolt, Frederick C.; Elter, Michael R.; Fromm, Paul M.; Grossi, Frank A.; Miller, Mark T.; Rasch, Kenneth R.; and Szlucha, Thomas F., 4,929,983, Cl. 355-315.000.

Szymanski, Wladyslaw W.: *See*—
Liu, Benjamin Y. H.; and Szymanski, Wladyslaw W., 4,928,537, Cl. 73-863.860.

T K Valve Limited: *See*—
Steele, John, 4,928,921, Cl. 251-175.000.

Tabakoff, Boris: *See*—
Hendricks, Katherine A., 4,929,228, Cl. 600-27.000.

Tabara, Yoshitaka: *See*—
Shinya, Yoshiyuki; Tabara, Yoshitaka; Okuno, Itaru; Kaneko, Tadashi; and Watanabe, Tomomi, 4,928,652, Cl. 123-417.000.

Tabira, Masatoshi: *See*—
Murata, Hiroaki; Inomata, Teruhisa; and Tabira, Masatoshi, 4,929,866, Cl. 313-500.000.

Tabuchi, Hiroki: *See*—
Sugihara, Takashi; Uda, Kazutaka; Tabuchi, Hiroki; Inami, Yasuhiko; Hijikigawa, Masaya; and Kataoka, Shoei, 4,928,513, Cl. 73-1.00G.

Tachi-S Company, Ltd.: *See*—
Kawasaki, Kiyoshi, 4,928,609, Cl. 112-121.120.
Urai, Muneharu; Makino, Hiroyuki; and Shimada, Makoto, 4,929,304, Cl. 156-245.000.

Tacke, Peter: *See*—
Nouvertne, Werner; Gielen, Franz-Josef; Tacke, Peter; Grigo, Ulrich; Quiring, Bernd; and Lindner, Christian, 4,929,674, Cl. 325-66.000.

Tada, Tetsuya, to Toyota Jidosha Kabushiki Kaisha. Speed control apparatus with compensation for actuator link play. 4,928,780, Cl. 180-179.000.

Tadokoro, Toyohiko: *See*—
Nakanishi, Tatsuo; Tadokoro, Toyohiko; and Fujimura, Masaki, 4,928,972, Cl. 273-78.000.

Tadokoro, Yoshio: *See*—
Shirasaki, Yoshikazu; and Tadokoro, Yoshio, 4,929,503, Cl. 428-373.000.

Tagami, Shigeru: *See*—
Ishikawa, Tadashi; Tagami, Shigeru; Akimoto, Kazuo; Tsuyuki, Hiroto; Kawai, Michio; Ito, Kanji; Sato, Takayuki; Otora, Takahito; and Hayakawa, Teruyo, 4,929,977, Cl. 354-420.000.

Tagawa, Hisatoshi: *See*—
Moriya, Yutaka; Sanpei, Tetsuya; and Tagawa, Hisatoshi, 4,929,289, Cl. 148-402.000.

Taglieber, Volker; Hoelderich, Wolfgang; Kummer, Rudolf; Mross, Wolf D.; and Saladin, Guenter, to BASF Aktiengesellschaft. Preparation of tert-butylamine from isobutese. 4,929,758, Cl. 564-485.000.

Taglieber, Volker; Hoelderich, Wolfgang; Kummer, Rudolf; Mross, Wolf D.; and Saladin, Guenter, to BASF Aktiengesellschaft. Production of amines from an olefin and ammonia or a primary or secondary amine. 4,929,759, Cl. 564-485.000.

Taguchi, Seizo; Oketani, Toshiharu; Ohashi, Michihiro; Tanaka, Hideaki; and Terao, Hiroshi, to Mitsubishi Jukogyo Kabushiki Kaisha; and Kabushiki Kaisha Okazaki Seisakusho. Resistance temperature detector. 4,929,092, Cl. 374-183.000.

Taguchi, Takafumi: *See*—
Nishimura, Yoshifumi; Yamamoto, Susumu; Nakata, Hidekazu; Muraoka, Kiyoshige; Uchida, Mamoru; and Taguchi, Takafumi, 4,929,512, Cl. 428-610.000.

Taguchi, Yutaka: *See*—
Eda, Kazuo; Miwa, Tetsuji; and Taguchi, Yutaka, 4,930,044, Cl. 361-313.000.

Taig, Alistair G.: *See*—
Johannesen, Donald D.; and Taig, Alistair G., 4,928,543, Cl. 475-196.000.

Tajima, Hatsuo: *See*—
Kubo, Takahiro; and Tajima, Hatsuo, 4,929,981, Cl. 355-253.000.

Takada, Mitsuru; Takahashi, Tokuyuki; and Itoh, Hiroshi, to Toyota Jidosha Kabushiki Kaisha. Hydraulic transmission controller with coupling pressure compensation. 4,928,557, Cl. 74-867.000.

Takada, Osamu: *See*—
Takahashi, Yasuhiro; and Takada, Osamu, 4,930,122, Cl. 370-85.150.

Takagi, Katsuaki: *See*—
Nakagawa, Norio; Takagi, Katsuaki; and Aoki, Hirokazu, 4,930,104, Cl. 365-49.000.

Takagi, Masahiro: *See*—
Shinoki, Masayoshi; Takagi, Masahiro; Nagatsuka, Ikutaroh; Kumashiro, Koichi; Aoki, Takayoshi; and Takeda, Masayuki, 4,929,528, Cl. 430-108.000.

Takagi, Shigekazu: *See*—
Abe, Fumio; Mori, Hiroshi; and Takagi, Shigekazu, 4,929,406, Cl. 264-45.500.

Takahashi, Kotoyoshi, to Seiko Epson Corporation. Non-linear element for liquid crystal displays. 4,929,059, Cl. 350-334.000.

Takahashi, Kunimasa; Kameda, Takashi; and Shibata:i, Haruo, to Mitsubishi Petrochemical Company Limited. Graphitic or carbonaceous moldings and processes for producing the same. 4,929,404, Cl. 264-29.500.

Takahashi, Seiya: *See*—
Harakawa, Yoshihiro; Takahashi, Seiya; Izawa, Koji; Takeuchi, Hidemitsu; and Ikari, Keizo, 4,929,316, Cl. 204-56.100.

Takahashi, Tokihiro: *See*—
Nagahara, Shinichi; Suzuki, Tomoyuki; Yamada, Tomoyasu; Takahashi, Tokihiro; and Miyake, Ichiro, 4,930,031, Cl. 360-107.000.

Takahashi, Tokuyuki: *See*—
Takada, Mitsuru; Takahashi, Tokuyuki; and Itoh, Hiroshi, 4,928,557, Cl. 74-867.000.

Takahashi, Toshiro; Kameoka, Kimitaka; and Inagaki, Yoshio, to Fuji Photo Film Co., Ltd. High contrast negative image-forming process. 4,929,535, Cl. 430-264.000.

Takahashi, Tsugio: *See*—
Imura, Yoshio; and Takahashi, Tsugio, 4,929,971, Cl. 354-75.000.

Takahashi, Yasuhiro; and Takada, Osamu, to Hitachi, Ltd. Message transfer system and method. 4,930,122, Cl. 370-85.150.

Takahashi, Yugi: *See*—
Sugi, Tokio; Mori, Yasuo; and Takahashi, Yugi, 4,928,524, Cl. 73-200.000.

Takahashi, Yukiko: *See*—
Shibahara, Seiji; Takahashi, Yukiko; Matsuhashi, Yuji; Hachisu, Mitsugu; Kondo, Shinichi; Takeuchi, Tomio; and Aoyagi, Takaaki, 4,929,633, Cl. 514-423.000.

Takahira, Kenichi, to Mitsubishi Denki Kabushiki Kaisha. IC card having internal error checking capability. 4,930,129, Cl. 371-40.400.

Takaishi, Minoru: *See*—
Matsui, Fumio; Suzuki, Noboru; Takaishi, Minoru; Ogura, Ryushi; Harigai, Noriaki; Hashimoto, Tadayoshi; and Uematu, Tomoe, 4,929,494, Cl. 428-286.000.

Takakusaki, Nobuyuki; Mizutani, Yohji; Kishida, Nobuhiro; and Hosokawa, Manabu, to Toyo Seikan Kaisha, Ltd. Delivery apparatus in machine for preparing plastic hollow vessels. 4,929,450, Cl. 425-526.000.

Takamura, Seiji: *See*—
Takematsu, Tetsuo; Yakeuchi, Yasutomo; Takenaka, Mitsuaki; Takamura, Seiji; and Matsushita, Akio, 4,929,273, Cl. 71-118.000.

Takamura, Shinji: *See*—
Koda, Akihide; Kita, Jun'ichiro; Kuroki, Yoshiaki; Fujiwara, Hiroshi; Takamura, Shinji; and Yamano, Kayoko, 4,929,618, Cl. 514-253.000.

Takano, Shyunsuke: *See*—
Maeda, Satoru; Noguchi, Yasushi; Yasuda, Kazunori; and Takano, Shyunsuke, 4,930,014, Cl. 358-209.000.

Takasaki, Kanetake, to Fujitsu Limited. Compound semiconductor device. 4,929,985, Cl. 357-15.000.

Takase, Shigeyuki: *See*—
Kobashi, Rikizo; Takase, Shigeyuki; Enomoto, Hiroyuki; Hayasaki, Yasushi; Kobayashi, Toyohisa; and Yamazaki, Shingo, 4,929,685, Cl. 525-277.000.

Takata Corporation: *See*—
Tsuji, Yasuo, 4,928,902, Cl. 242-107.200.

Takata, Hirotoshi; Suruga, Eihiro; and Inoue, Gentei, to Nippon Seiko Kabushiki Kaisha. Self-aligning roller bearing. 4,929,098, Cl. 384-450.000.

Takayama, Hidehiko: *See*—
Eitai, Kazuo; and Takayama, Hidehiko, 4,929,156, Cl. 417-295.000.

Takeda Chemical Industries, Ltd.: *See*—
Morita, Yasuhiko; Kakiguchi, Yoshitomi; and Izuhara, Seiji, 4,929,378, Cl. 252-105.000.

Takeda, Hideki: *See*—
Takenawa, Seishi; Takeda, Hideki; and Horikoshi, Mie, 4,929,451, Cl. 426-10.000.

Takeda, Hisao; and Kawano, Mutsumi, to Kyoritsu Yuki Co., Ltd. Process for production of water-soluble polymer dispersion. 4,929,655, Cl. 524-458.000.

Takeda, Masayuki: *See*—
Shinoki, Masayoshi; Takagi, Masahiro; Nagatsuka, Ikutaroh; Kumashiro, Koichi; Aoki, Takayoshi; and Takeda, Masayuki, 4,929,528, Cl. 430-108.000.

Takehara, Nobumitsu: *See*—
Oshikoshi, Yuji; Suganuma, Yoshimi; Hara, Hiroshi; Shiota, Kazuo; Takehara, Nobumitsu; and Sakamoto, Kiichiro, 4,928,996, Cl. 283-109.000.

Takei, Katsumori: *See*—
Aoki, Kenji; Takei, Katsumori; Nakamura, Haruo; and Matsushita, Yoshikazu, 4,929,057, Cl. 350-333.000.

Takematsu, Tetsuo; Yakeuchi, Yasutomo; Takenaka, Mitsuaki; Takamura, Seiji; and Matsushita, Akio, to Ube Industries, Ltd. N-benzyl-2-(4-fluoro-3-trifluoromethylphenoxy)butanoic amide and herbicidal composition containing the same. 4,929,273, Cl. 71-118.000.

Takemoto, Satoru, to Fuji Photo Film Co., Ltd. Heating resistor driving circuit which suppresses current spikes. 4,929,815, Cl. 219-501.000.

Takemoto Yushi Kabushiki Kaisha: *See*—
Yamamoto, Hisao; and Nakamura, Atsushi, 4,929,366, Cl. 252-8.600.

Takenaka, Mitsuaki: *See*—
Takematsu, Tetsuo; Yakeuchi, Yasutomo; Takenaka, Mitsuaki; Takamura, Seiji; and Matsushita, Akio, 4,929,273, Cl. 71-118.000.

Takenaka, Takaji; Netsu, Tositada; Shigi, Hidetaka; and Yamamoto, Masakazu, to Hitachi, Ltd. Multi-chip module structure. 4,930,002, Cl. 357-75.000.

Takenawa, Seishi; Takeda, Hideki; and Horikoshi, Mie, to Fujisawa Pharmaceutical Company, Ltd. Process for eliminating disagreeable odor from soya milk. 4,929,451, Cl. 426-10.000.

Takeshita, Takuo; Sugihara, Tadashi; and Fujino, Shuichi, to Mitsubishi Metal Corporation. Superconductor containing internal stress absorber. 4,929,597, Cl. 505-1.000.

Takeuchi, Atsushi: *See*—
Muto, Shunichi; Inata, Tsuguo; Takeuchi, Atsushi; and Sugiyama, Yoshihiro, 4,929,984, Cl. 357-4.000.

Takeuchi, Hajime: *See*—
Shimizu, Giichiro; Shimizu, Misao; Takeuchi, Hajime; Okuyama, Toshiharu; and Wakatuski, Yoshio, 4,930,096, Cl. 364-550.000.

Takeuchi, Hidemitsu: *See*—
Harakawa, Yoshihiro; Takahashi, Seiya; Izawa, Koji; Takeuchi, Hidemitsu; and Ikari, Keizo, 4,929,316, Cl. 204-56.100.

Takeuchi, Hiroshi; and Yoshimura, Yoshinari, to Kabushiki Kaisha Daikin Seisakusho. Friction device in a damper disk. 4,928,805, Cl. 192-106.200.

Takeuchi, Hiroyuki: *See*—
Yabusaki, Masao; Yamamoto, Etsuji; Takeuchi, Hiroyuki; and Kohno, Hideki, 4,929,881, Cl. 324-318.000.

Takeuchi, Tomio: *See*—
Shibahara, Seiji; Takahashi, Yukiko; Matsuhashi, Yuji; Hachisu, Mitsugu; Kondo, Shinichi; Takeuchi, Tomio; and Aoyagi, Takaaki, 4,929,633, Cl. 514-423.000.

Takigawa, Akio: *See*—
Kitayama, Shinichiro; Adachi, Teruho; Ueda, Masahiro; Aoki, Yuichi; Shiiki, Satoshi; Takigawa, Akio; Yoshida, Motoaki; Imamura, Naoya; Maeda, Koichi; and Kayanoki, Hisayuki, 4,929,523, Cl. 430-4.000.

Takimoto, Kiyoshi: *See*—
Sakai, Kunihiro; Miyazaki, Toshihiko; Eguchi, Ken; Kawada, Haruki; Tomida, Yoshinori; Kimura, Toshiaki; Matsuda, Hiroshi; Takimoto, Kiyoshi; and Saito, Kenji, 4,929,524, Cl. 430-56.000.

Takizawa, Shozo: *See*—
Harara, Mitsuhiko; Takizawa, Shozo; Tanaka, Tadao; and Wada, Shunichi, 4,930,082, Cl. 364-424.050.

Takushima, Shigehiro: *See*—
Watanabe, Tsutomu; Sagiyama, Masari; Kawabe, Masaki; Tsujihara, Toshiyuki; and Takushima, Shigehiro, 4,929,323, Cl. 204-206.000.
Watanabe, Tsutomu; Sagiyama, Masaru; Kawabe, Masaki; Tsujihara, Toshiyuki; and Takushima, Shigehiro, 4,929,324, Cl. 204-206.000.

Tami, Kazuya: *See*—
Hiramatsu, Tohru; Tami, Kazuya; and Ohchi, Torao, 4,928,612, Cl. 112-257.000.

Tamura, Hideyuki, to Nissan Motor Company, Limited. Oxygen sensor operability sensing arrangement. 4,928,518, Cl. 73-117.300.

Tamura, Masahiro: *See*—
Shishido, Kihachi; Matsuoka, Masami; Ishihara, Noriyuki; and Tamura, Masahiro, 4,929,479, Cl. 428-35.200.

Tanai, Tsuneo: *See*—
Niizato, Tomonori; Tanai, Tsuneo; Kasahara, Kazuhiro; Saka, Tsutomu; and Oikawa, Toshihiro, 4,928,641, Cl. 123-90.160.

Tanaka, Akinori: *See*—
Suzuki, Akinori; Hyeon, Suong B.; Kajita, Toshio; Furushima, Masakazu; Yoshinaka, Shigeo; Suzuki, Takashi; Oda, Mitsunori; and Tanaka, Akinori, 4,929,267, Cl. 71-77.000.

Tanaka, Hideaki: *See*—
Taguchi, Seizo; Oketani, Toshiharu; Ohashi, Michihiro; Tanaka, Hideaki; and Terao, Hiroshi, 4,929,092, Cl. 374-183.000.

Tanaka, Hirokazu: *See*—
Okuhara, Masakuni; Tanaka, Hirokazu; Goto, Toshio; Kino, Tohru; and Hatanaka, Hiroshi, 4,929,611, Cl. 514-183.000.
Setoi, Hiroyuki; Kuroda, Akio; Tanaka, Hirokazu; Hirai, Hideo; Marusawa, Hiroshi; and Hashimoto, Masashi, 4,929,639, Cl. 514-452.000.

Tanaka, Hiroyuki; Uto, Kuniharu; Kawai, Kazumi; Shaura, Tsuneo; and Yasuhuku, Motonobu, to Mitsuboshi Belting Ltd. Power transmission toothed belt and drive. 4,929,221, Cl. 474-205.000.

Tanaka, Hitoshi; Hori, Ryoichi; Itoh, Kiyoo; Kimura, Katsutaka; and Shimohigashi, Katsuhiro, to Hitachi, Ltd.; and Hitachi VLSI Engineering Corporation. Semiconductor device having a voltage limiter. 4,930,112, Cl. 365-226.000.

Tanaka, Hitoshi: *See*—
Yamamoto, Yoko; Tanaka, Hitoshi; and Mikami, Noboru, 4,929,081, Cl. 356-354.000.

Tanaka, Masayuki: *See*—
Abe, Shinya; Miyamoto, Mitsuaki; Tanaka, Masayuki; Akasaka, Kozo; Hayashi, Kenji; Kawahara, Tetsuya; Katayama, Satoshi; Sakuma, Yoshinori; Suzuki, Takeshi; and Yamatsu, Isao, 4,929,623, Cl. 514-293.000.

Tanaka, Mitsugu; and Sakai, Takeo, to Fuji Photo Film Co., Ltd. Recording liquid. 4,929,277, Cl. 106-22.000.

Tanaka, Nobuo: *See*—
Moritani, Tohei; Oda, Hidemasa; Sato, Toshiaki; Negi, Taichi; Matsumura, Keiji; Kawai, Syuji; Tanaka, Nobuo; and Hirofuji, Satoshi, 4,929,482, Cl. 428-36.400.

Tanaka, Shigeru; and Miura, Kazutoshi, to Kabushiki Kaisha Toshiba. Phase stabilized high frequency link power converter apparatus having a wide phase controllable range. 4,930,064, Cl. 363-161.000.

Tanaka, Shin-Ichi: *See*—
Honjo, Kazuhiko; and Tanaka, Shin-Ichi, 4,929,997, Cl. 357-34.000.

Tanaka, Tadao: *See*—
Harara, Mitsuhiko; Takizawa, Shozo; Tanaka, Tadao; and Wada, Shunichi, 4,930,082, Cl. 364-424.050.

Tanaka, Toshihiro: *See*—
Haga, Takahiro; Tsujii, Yasuhiro; Isogai, Tatsuo; Murai, Shigeo; and Tanaka, Toshihiro, 4,929,729, Cl. 544-330.000.

Tanigaki, Ryuhei: *See*—
Itahana, Tsutomu; Kanno, Hideo; Ono, Tetsuo; Furuta, Futoru; Kobayashi, Susumu; Akimoto, Ryosaku; and Tanigaki, Ryuhei, 4,928,723, Cl. 137-116.300.

Taniguchi, Takashi: *See*—
Akashi, Ryojiro; and Taniguchi, Takashi, 4,929,693, Cl. 526-259.000.

Tanimoto, Koji: *See*—
Egawa, Jiro; Tanimoto, Koji; and Miura, Kunihiko, 4,930,087, Cl. 364-518.000.

Tanimura, Toyokiti; and Ikeda, Masahiro, to Konica Corporation. Film perforator. 4,928,562, Cl. 83-278.000.

Tanino, Mitsuru: *See*—
Komatsu, Hajime; Tanino, Mitsuru; Suga, Yozo; and Konno, Toyohiko, 4,929,286, Cl. 148-111.000.

Tarascon, Jean-Marie: *See*—
Bagley, Brian G.; and Tarascon, Jean-Marie, 4,929,598, Cl. 505-1.000.

Tarzaiski, Richard J.: *See*—
Chmielewski, Thomas A., Jr.; and Tarzaiski, Richard J., 4,929,843, Cl. 250-561.000.

Tateishi, Kiyoshi, to Pioneer Electronic Corporation. Track jump operation control apparatus in a disk player. 4,930,114, Cl. 369-32.000.

Taya, Akira: *See*—
Tominaga, Mamoru; Kokado, Naoyuki; Gonpei, Katsuhiro; Nira, Hisami; and Taya, Akira, 4,929,061, Cl. 350-338.000.

Taylor, Harry L.; and Ehret, Charles O. Air flow control system. 4,928,583, Cl. 98-31.600.

Taylor, Robert, to North American Specialities Corporation. Connector. 4,929,193, Cl. 439-567.000.

Tech Research, Inc.: *See*—
Reigstad, Gordon H.; Breivik, A. Norris; and Reigstad, Hanley S., 4,928,451, Cl. 52-223.00L.

Tecle, Haile: *See*—
Coughenour, Linda L.; Davis, Robert E.; Downs, David A.; Heffner, Thomas G.; Meltzer, Leonard T.; Moos, Walter H.; Moreland, David W.; and Tecle, Haile, 4,929,734, Cl. 546-338.000.

Tecumseh Products Company: *See*—
Kronich, Peter G., 4,928,651, Cl. 123-196.0AB.

Tedenac, Jean-Claude: *See*—
Brun, Gerard; Marin-Ayral, Rose-Marie; Maurin, Maurice; Pistoulet, Bernard; and Tedenac, Jean-Claude, 4,929,282, Cl. 136-239.000.

Teijin Seiki Co., Ltd.: *See*—
Matsumoto, Kazuyuki; Hashimoto, Masataka; and Iwata, Michiyoshi, 4,928,556, Cl. 475-149.000.

Tejima, Kunisuke: *See*—
Hayase, Isao; Ushiku, Kenichi; Tejima, Kunisuke; Hayashi, Seiichi; and Satoh, Kazuhiko, 4,929,159, Cl. 417-295.000.

Tengelitsch, John J. Power trim cylinder protective locking device for an inboard/outboard boat motor. 4,929,202, Cl. 440-55.000.

Terada, Akihiko: *See*—
Ueda, Kenichi; Hattori, Kouji; Terada, Akihiko; and Inohara, Kazuyoshi, 4,929,934, Cl. 340-706.000.

Terao, Hiroshi: *See*—
Taguchi, Seizo; Oketani, Toshiharu; Ohashi, Michihiro; Tanaka, Hideaki; and Terao, Hiroshi, 4,929,092, Cl. 374-183.000.

Terawaki, Hiroshi: *See*—
Osaka, Tatsuhiko; Terawaki, Hiroshi; and Okamoto, Mitsunari, 4,929,330, Cl. 204-402.000.

ter Hasebrg, Jan L.; Nedwig, Joachim; and Kruse, Klaus-Dieter, to Licentia Patent-Verwaltungs GmbH. Electro-optical measuring and transmission device using overload and overvoltage protection circuits. 4,929,842, Cl. 250-551.000.

Terzian, Rouben T.: *See*—
Morris, Lamont C.; Kuns, Wayne A.; and Terzian, Rouben T., 4,929,216, Cl. 446-324.000.

Tessler, Martin M.: *See*—
Billmers, Robert L.; Del Giudice, David M.; Tessler, Martin M.; and Hasuly, Michael J., 4,929,670, Cl. 525-54.100.

Testa, Bruce V.: *See*—
Buyak, William P.; Testa, Bruce V.; and Right, Robert W., 4,929,924, Cl. 340-384.00E.

Testing Machines Inc.: *See*—
Bachelder, Walter F.; Sullivan, John L.; Fiore, Peter J.; and Hansen, Godfrey L., 4,928,533, Cl. 73-838.000.

Teubert, Joachim. Mold filling method and transport apparatus for bead-like resilient material transported by a fluid. 4,928,739, Cl. 141-5.000.

Texaco Inc.: *See*—
Powers, William J., III; Matthews, Leonard A.; and Jao, Tze-Chi, 4,929,373, Cl. 252-33.000.

Texas A&M University System, The: *See*—
Buth, C. Eugene; Qureshy, Asif; Ross, Hayes E., Jr.; and Sicking, Dean L., 4,928,928, Cl. 256-13.100.

Texas Instruments Incorporated: *See*—
Breuninger, Robert K., 4,929,850, Cl. 307-272.100.
Hutter, Louis N., 4,929,996, Cl. 357-34.000.

Textron, Inc.: *See*—
Gassen, James R.; and Suchdev, Lakhbir S., 4,928,390, Cl. 30-123.400.

Teyssedre, Alain: *See*—
Butler, David R.; Snow, George; Sandford, Philip; Neu, Max G.; Villani, Jean P.; Teyssedre, Alain; and Lenoir, Roland, 4,928,746, Cl. 164-362.000.

Tezuka, Sigeru, to Fuji Photo Film Co., Ltd. Quantitative pipette. 4,929,428, Cl. 422-100.000.

Tezuka, Sigeru: *See*—
Kido, Keishiro; and Tezuka, Sigeru, 4,928,540, Cl. 73-864.110.

Tezuka, Toshiaki; Koshizuka, Kunihiro; and Abe, Takao, to Konica Corporation. Thermal transfer recording material. 4,929,593, Cl. 503-227.000.

Thames Pharmacal Co., Inc.: *See*—
Blackman, Steven T., 4,929,619, Cl. 514-263.000.

Thedford, Guy N.; and Wells, Gary L., to J. I. Case Company. Air system for a cotton harvester. 4,928,459, Cl. 56-13.300.

Theobald, Hans: *See*—
Leyendecker, Joachim; Buerstinghaus, Rainer; Theobald, Hans; Kuenast, Christoph; and Hofmeister, Peter, 4,929,617, Cl. 514-252.000.

Thermo-Blade, Inc.: *See*—
Meltzer, Elliott A.; and DiIoia, Albert A., 4,928,345, Cl. 15-250.060.

Theuer, Werner: *See*—
Mazanek, Jan; von Gizycki, Ulrich; Muller, Hanns P.; Wienkenhover, Martin; Wieser, Karl-Heinz; Paulat, Volker; Theuer, Werner; and Muller, Walter, 4,929,705, Cl. 528-49.000.

Theurer, Josef; Oellerer, Friedrich; and Gruber, Leopold R., to Franz Plasser Bahnbaumaschinen-Industriegesellschaft GmbH. Electric flash-butt welding machine and method of providing a welded joint between adjacent ends of rail sections. 4,929,816, Cl. 219-53.000.

Thibodeaux, Glenn. Crawfish peeling apparatus. 4,928,352, Cl. 17-73.000.

Thiokol Corporation: *See*—
Barnes, Michael W., 4,929,291, Cl. 149-19.400.

Thirumalachar, M. Jeersannidhi; and Narasimhan, M. Jeersannidhi, Jr., to Source Technology Earth Oils, Inc. Process and system for recovering oil from oil bearing soil such as shale and tar sands and oil produced by such process. 4,929,341, Cl. 208-390.000.

Thomas, Charles A.: *See*—
Danis, Sara L.; Skaggs, Charles L.; and Thomas, Charles A., 4,928,411, Cl. 40-324.000.

Thomas, David Y.: *See*—
Bussey, Howard; Dmochowska, Aleksandra; Thomas, David Y.; and Dignard, Danici, 4,929,553, Cl. 435-172.300.

Thomas, James M.; and Kern, Ronald D., to Colgate-Palmolive Co. Antistatic and fabric softening laundry wash cycle additive composition in filtering pouch. 4,929,367, Cl. 252-8.800.

Thomas, Mammen; and Weinberg, Matthew, to Advanced Micro Devices, Inc. MOS transistor construction with self aligned silicided contacts to gate, source, and drain regions. 4,929,992, Cl. 357-23.900.

Thomas, Michael H.: *See*—
Foreman, Larry R.; Gomez, Veronica M.; and Thomas, Michael H., 4,929,306, Cl. 156-306.300.

Thomas, Neil L.: *See*—
O'Brien, John T.; Thomas, Neil L.; and Dyer, Tracy D., 4,929,946, Cl. 341-87.000.

Thomas, Paul; and Ahina, Lionel M. Toothbrush cabinet for holding of toothbrushes and toothpaste in bathroom. 4,929,039, Cl. 312-213.000.

Thome, Caryl: *See*—
Prus, Eric; Frene, Andre ; Bordaz, Pascal; Guerange, Patrick; and Thome, Caryl, 4,928,880, Cl. 239-8.000.

Thomma, Gunther: *See*—
Lotz, Horst K.; and Thomma, Gunther, 4,928,932, Cl. 266-58.000.

Thompson, George O. Forklift adapter for stocking vertical racks. 4,929,145, Cl. 414-607.000.

Thomson Brandt Armements: *See*—
Esterlin, Jacques; Le Parquier, Guy; and Roux, Jean Pierre, 4,928,570, Cl. 89-6.500.

Thomson-CSF: *See*—
de Boisseron, Bertrand; Salvan, Michel; and Gugenhein, Michele, 4,930,124, Cl. 370-94.300.
Elleaume, Philippe, 4,929,954, Cl. 342-194.000.

Thorn, William F., to Automotive Systems Laboratory, Inc. Aspirating inflator assembly. 4,928,991, Cl. 280-738.000.

Thornton, Thomas F. Dental treatment apparatus. 4,928,675, Cl. 128-66.000.

Tierman, Joan E., to United States of America, Energy. Treatment of concentrated industrial wastewaters originating from oil shale and the like by electrolysis polyurethane foam interaction. 4,929,359, Cl. 210-663.000.

Tikbonovich, Vadim I.; Pavljuk, Vladimir D.; Vinokur, Bertold B.; Kondratjuk, Stanislav E.; Lutsenko, Georgy G.; Edemsky, Vladimir K.; Kiselev, Vladimir B.; Karasev, Nikolai M.; and Myakishev, Anatoly K. Cast steel. 4,929,416, Cl. 420-12.000.

Tilman, Paul A.; Machacek, Zdenek; and Scott, Richmond, to Minigrip, Inc. Bag making material having fastener profiles and alignment ribs with reinforcing and stabilizing beam effect ridge means. 4,929,487, Cl. 428-163.000.

Tin, Joshua K., to Remote Automation & Control Electronics Inc. Remote control car starter. 4,928,778, Cl. 180-167.000.

Tite, Raymond C., to Massey-Ferguson Services N.V. Metering device for seed or fertilizer. 4,928,858, Cl. 222-312.000.

Tobert, Jonathan A., to Merck & Co., Inc. Coenzyme Q_{10} with HMG-CoA reductase inhibitors. 4,929,437, Cl. 424-10.000.

Tochigifujisangyo Kabushiki Kaisha: *See*—
Ishikawa, Osamu; and Watanabe, Kazuyoshi, 4,928,803, Cl. 192-58.00B.

Todd, John A., to Dresser Industries, Inc. Environment protector for replaceable cartridge filters. 4,929,356, Cl. 210-248.000.

Toiyama, Masaoki: *See*—
Nakagawa, Sumio; Toiyama, Masaoki; Uno, Yoshinobu; and Kohda, Hiromichi, 4,929,768, Cl. 568-473.000.

Tokai Carbon Co., Ltd.: *See*—
Sugihara, Kanji; Yamamoto, Motohiro; Kida, Tohru; and Fukazawa, Minoru, 4,929,472, Cl. 427-215.000.

Tokai Corporation: *See*—
Nitta, Tomio, 4,929,175, Cl. 431-344.000.
Nitta, Tomio, 4,929,176, Cl. 431-344.000.

Tokuda, Shuichiro: *See*—
Fujigaki, Takashi; Fujinaga, Yoshikazu; Tokuda, Shuichiro; Furukawa, Noriyuki; Ichimura, Kiyoshi; Shibuya, Yukio; and Iuchi, Shigeru, 4,929,169, Cl. 425-385.000.

Tokuyama Soda Kabushiki Kaisha: *See*—
Nishimura, Masakatsu; Okada, Naoya; Murata, Yasuo; and Hirai, Yasuhiko, 4,929,317, Cl. 204-59.00R.

Tokyo Electric Co., Ltd.: *See*—
Izawa, Shoji, 4,930,017, Cl. 358-296.000.
Ochiai, Kuniaki; and Komakine, Shigeo, 4,929,101, Cl. 400-124.000.

Tokyo Juki Industrial Co., Ltd.: *See*—
Hiramatsu, Tohru; Tami, Kazuya; and Ohchi, Torao, 4,928,612, Cl. 112-257.000.

Tokyo Keiki Company, Ltd.: *See*—
Ando, Tsuyoshi; Hirono, Nakayasu; Nakao, Hirotoshi; Mito, Akio; Kihara, Kazuyuki; Hatakenaka, Kosuke; and Ogawa, Hiroshi, 4,928,730, Cl. 137-554.000.

Tokyo Keiso Co., Ltd.: *See*—
Sugi, Tokio; Mori, Yasuo; and Takahashi, Yugi, 4,928,524, Cl. 73-200.000.

Tomida, Yoshinori: *See*—
Sakai, Kunihiro; Miyazaki, Toshihiko; Eguchi, Ken; Kawada, Haruki; Tomida, Yoshinori; Kimura, Toshiaki; Matsuda, Hiroshi; Takimoto, Kiyoshi; and Saito, Kenji, 4,929,524, Cl. 430-56.000.

Tominaga, Kaoru; and Iwata, Tadao, to Mitsui Sekiyu Kagaku Kogyo Kabushiki Kaisha. Epoxy resin compositions. 4,929,708, Cl. 528-118.000.

Tominaga, Mamoru; Kokado, Naoyuki; Gonpei, Katsuhiro; Nira, Hisami; and Taya, Akira, to Kabushiki Kaisha Toshiba. Color liquid crystal display device. 4,929,061, Cl. 350-338.000.

Tonali S.p.A.: *See*—
Colombo, Attilio, 4,928,429, Cl. 49-41.000.

Toney, Crayton G.: *See*—
Mitchell, Larry L.; and Toney, Crayton G., 4,929,497, Cl. 428-265.000.

Tong, Dien H.: *See*—
Patterson, William A.; Tong, Dien H.; and Wooden, James R., 4,929,100, Cl. 400-124.000.

Tong, Hua Sou, to Zenith Electronics Corporation. NI-based FTM shadow masks having a nickel phosphide black layer. 4,929,864, Cl. 313-402.000.

Tonnelli, Gerald J., to Production Data, Inc. Steam injection survey apparatus and method for testing wells. 4,928,522, Cl. 73-155.000.

Toon, Donald A.; and Belslaw, Douglas J., to Solinst Canada Limited. Groundwater sampling apparatus. 4,928,541, Cl. 73-864.630.

Toray Industries, Inc.: *See*—
Akashi, Ryojiro; and Taniguchi, Takashi, 4,929,693, Cl. 526-259.000.

Torbus, Marek; Jerman, Franz; Ladegourdie, Gerard; Lingemann, Dirk; Seiss, Willi; and Vujevic, Aleksandar, to Huttenes-Albertus Chemische Werke GmbH. Cold-setting moulding binders and their use (phenols and gaseous acetals). 4,929,649, Cl. 523-145.000.

Toreman, Ulrik: *See*—
Soderberg, Terje; Sodersteen, Rolf; and Toreman, Ulrik, 4,928,945, Cl. 271-9.000.

Toro Company, The: *See*—
Peterson, Gerald E., 4,930,047, Cl. 361-395.000.

Torus Corporation: *See*—
Allen, Donavan J., 4,928,402, Cl. 34-97.000.

Toshiba Kikai Kabushiki Kaisha: *See*—
Motomura, Noriyuki, 4,928,933, Cl. 266-237.000.

Toshiba Silicone Co., Ltd.: *See*—
Kawai, Nobuyuki; and Nakamura, Mitsuhiro, 4,929,804, Cl. 200-5.00A.

Toshiyuki, Nakaie, to Hanwa Electronic Co., Ltd. Apparatus for detecting noise in the measurement of very small resistance. 4,929,886, Cl. 324-691.000.

Toto Ltd.: *See*—
Higuchi, Mitsuhiro; and Yamamoto, Hirofumi, 4,928,325, Cl. 4-247.000.

Tottori, Takeshi: *See*—
Fujiwara, Hideo; Tottori, Takeshi; Inagoya, Osamu; and Mikami, Hirosuke, 4,928,382, Cl. 29-603.000.

Tou, Frederich N.; and Hasan, Wagar, to IntelliCorp, Inc. Method for integrating a knowledge-based system with an arbitrary database system. 4,930,071, Cl. 364-300.000.

Toyama, Akira, to Nippon Precision Circuits Ltd. Constant width pulse distribution in a digital to analog converter for serial digital data. 4,929,947, Cl. 341-146.000.
Toyama, Tadahisa: *See*—
Sugimoto, Naoshige; Yoshida, Tetsuhi; and Toyama, Tadahisa, 4,929,060, Cl. 350-339.00F.
Toyo Boseki Kabushiki Kaisha: *See*—
Shirasaki, Yoshikazu; and Tadokoro, Yoshio, 4,929,503, Cl. 428-373.000.
Toyo Kahan Co., Ltd.: *See*—
Hayashi, Yoshio; Nakamoto, Tetsuo; Kanada, Katsumi; and Kondo, Yoshikazu, 4,929,171, Cl. 427-54.100.
Toyo Seikan Kaisha, Ltd.: *See*—
Takakusaki, Nobuyuki; Mizutani, Yohji; Kishida, Nobuhiro; and Hosokawa, Manabu, 4,929,450, Cl. 425-526.000.
Toyoda Gosei Co., Ltd.: *See*—
Ito, Kuniyasu, 4,930,048, Cl. 362-26.000.
Iwasa, Tadanobu, 4,929,481, Cl. 428-36.100.
Iwasa, Tadanobu, 4,929,490, Cl. 428-195.000.
Kasugai, Joji, 4,929,263, Cl. 55-502.000.
Kuzuhara, Michio; Shibasaki, Jun; St. Louis, Andree; St. Laurent, Christian; and Bedard, Michel, 4,928,431, Cl. 49-479.000.
Toyota Jidosha Kabushiki Kaisha: *See*—
Suzuki, Toshitake;; Komoda, Norio; Oda, Susumu; and Harata, Motoo, 4,929,859, Cl. 310-328.000.
Tada, Tetsuya, 4,928,780, Cl. 180-179.000.
Takada, Mitsuru; Takahashi, Tokuyuki; and Itoh, Hiroshi, 4,928,557, Cl. 74-867.000.
Trackman, Marshall H.: *See*—
Graham, Scott M.; Ewing, Kenneth R.; Trackman, Marshall H.; and Darr, Duane R., 4,929,099, Cl. 400-76.000.
Trailer Train Company: *See*—
Yeates, Richard P.; Keating, Bruce E.; and Halliar, William R., 4,929,132, Cl. 410-56.000.
Trainor, John E.: *See*—
Del Gatto, Henry J.; and Trainor, John E., 4,928,456, Cl. 55-12.000.
Trampel, Darrell W., to Iowa State University Research Foundation, Inc. Egg inoculation method. 4,928,629, Cl. 119-1.000.
Trampel, Darrell W.: *See*—
Gassman, Max P.; Larson, David J.; and Trampel, Darrell W., 4,928,628, Cl. 119-1.000.
Travis, Gilbert E. Lubrication control. 4,928,644, Cl. 123-188.00P.
Trend, John E., to Minnesota Mining and Manufacturing Company. Inclusion complexes providing second harmonic generation. 4,929,392, Cl. 252-582.000.
Trenkner, Fritz: *See*—
Breitenfelder, Wilhelm; and Trenkner, Fritz, 4,928,684, Cl. 128-204.210.
Tresslar, Marie C.: *See*—
Conaghan, Thomas B.; Gladfelter, Harry F.; Kite, Joseph S., III; and Tresslar, Marie C., 4,929,478, Cl. 428-35.100.
Tri Fire Holdings, Ltd.: *See*—
Shaw, William S., 4,928,667, Cl. 126-512.000.
Trick, Robert E., to Medical Engineering Corporation. Nocturnal penile tumescence and rigidity monitor. 4,928,706, Cl. 128-774.000.
Trimate: *See*—
Gianfranco, Cassanelli, 4,928,434, Cl. 51-3.40H.
Trimmer, Johnny L.: *See*—
Caskey, Terrence L.; Trimmer, Johnny L.; and Jorgensen, Janine L., 4,929,259, Cl. 55-158.000.
Trion Corporation: *See*—
Aoki, Akio, 4,928,320, Cl. 2-19.000.
Tripp, Thomas M.: *See*—
Smith, Thomas R.; and Tripp, Thomas M., 4,929,222, Cl. 474-255.000.
Trotter, Jimmy R.; and Sublett, Bobby J., to Eastman Kodak Company. Flexible, biaxially oriented films of modified poly (ethylene terephthalate). 4,929,714, Cl. 528-272.000.
Troue, Harden H.: *See*—
Sue, Jiinjen A.; and Troue, Harden H., 4,929,322, Cl. 204-192.380.
Troxler Electronic Laboratories, Inc.: *See*—
Dishman, Michael R., 4,929,885, Cl. 324-664.000.
Truchsess, Joseph; and Matthews, Michael. Mouth-operated control device. 4,929,826, Cl. 250-221.000.
Trutzschler GmbH & Co. KG: *See*—
Leifeld, Ferdinand, 4,928,355, Cl. 19-105.000.
TRW Inc.: *See*—
Johnson, Jerry E.; and Hoerner, Clinton C., Jr., 4,928,726, Cl. 137-327.000.
Tsao, Ying-Yen P.; and von Ballmoos, Roland, to Mobil Oil Corporation. Reactivating catalysts containing noble metals on molecular sieves containing oxides of aluminum and phosphorus. 4,929,576, Cl. 502-35.000.
Tsay, Wen-Her. Structure of sealing string. 4,929,006, Cl. 292-324.000.
Tscheschlok, Klaus: *See*—
Schupp, Gerhard; Tscheschlok, Klaus; and Johann, Maischberger, 4,928,386, Cl. 29-824.000.
Tse, Kwok-Tuen: *See*—
Armbruster, David R.; and Tse, Kwok-Tuen, 4,929,648, Cl. 523-147.000.
Tsentr Nauchno-Tekhnicheskogo Tvorchestva Molodezhi "ASTRON" : *See*—
Ivannikov, Alfred V.; and Abudardin, Vladimir Z., 4,929,812, Cl. 219-137.200.
Tsitlik, Joshua: *See*—
Halperin, Henry; Tsitlik, Joshua; Weisfeldt, Myron; and Gelfand, Mark, 4,928,674, Cl. 128-30.200.
TSL Incorporated: *See*—
Curiel, Yoram, 4,928,837, Cl. 215-250.000.
Tsuchida, Yoshiki, to Ishikawajima-Harima Heavy Industries Co. Apparatus for measuring temperatures indicative of thermal conductivity. 4,929,089, Cl. 374-44.000.
Tsuji, Hiroshi: *See*—
Otoshima, Hiroo; Tsuji, Hiroshi; Mori, Shigeki; and Nishimura, Yoshihiro, 4,928,476, Cl. 57-268.000.
Tsuji, Mitsuji: *See*—
Abe, Hiroomi; Nishio, Taichi; Suzuki, Yasurou; Sanada, Takashi; and Tsuji, Mitsuji, 4,929,675, Cl. 525-66.000.
Tsuji, Sadahiko, to Canon Kabushiki Kaisha. Conversion lens. 4,929,068, Cl. 350-422.000.
Tsuji, Yasuo, to Takata Corporation. Vehicle seat belt retractor. 4,928,902, Cl. 242-107.200.
Tsujihara, Toshiyuki: *See*—
Watanabe, Tsutomu; Sagiyama, Masari; Kawabe, Masaki; Tsujihara, Toshiyuki; and Takushima, Shigehiro, 4,929,323, Cl. 204-206.000.
Watanabe, Tsutomu; Sagiyama, Masaru; Kawabe, Masaki; Tsujihara, Toshiyuki; and Takushima, Shigehiro, 4,929,324, Cl. 204-206.000.
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Tsukahara, Toshiro: *See*—
Yabu, Atsuhiro; and Tsukahara, Toshiro, 4,930,030, Cl. 360-107.000.
Tsunoda, Yoshiaki; and Kanaya, Masatoshi, to Kabushiki Kaisha Toshiba. Method of manufacturing semiconductor device with overvoltage self-protection. 4,929,563, Cl. 437-6.000.
Tsuruoka, Yoshihiro: *See*—
Kohtoh, Noriaki; Tsuruoka, Yoshihiro; Abe, Toyohiko; and Fukuro, Hiroyoshi, 4,929,658, Cl. 524-219.000.
Tsuyama Mfg. Co., Ltd.: *See*—
Maeyama, Hachiro, 4,929,825, Cl. 250-221.000.
Tsuyuki, Hiroto: *See*—
Ishikawa, Tadashi; Tagami, Shigeru; Akimoto, Kazuo; Tsuyuki, Hiroto; Kawai, Michio; Ito, Kanji; Sato, Takayuki; Otora, Takahito; and Hayakawa, Teruyo, 4,929,977, Cl. 354-420.000.
Tucker, Kay L.; and Ma, Ulysses, to Cookson Group plc. Low toxicity alloy compositions for joining and sealing. 4,929,423, Cl. 420-561.000.
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Audren, Yves; and Tuffal, Guy, 4,928,898, Cl. 242-55.100.
Tunker, Gerhard, to Flachglas Aktiengesellschaft. Method of applying a coloration coating to a glass pane. 4,929,493, Cl. 428-207.000.
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Tuppini, Remigio, to Tuppini Bigiotterie S.r.l. Articulated bracelet with composite elements. 4,928,504, Cl. 63-9.000.
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Turk, Herbert M., to B.F. Goodrich Company, The. Crosslinkable silicone polymers with talc reinforcing agents having improved non-sag and modulus properties. 4,929,664, Cl. 524-451.000.
Turro, Glenn T.: *See*—
McBeath, Les L.; Sheikholeslami, Amir M.; and Turro, Glenn T., 4,929,933, Cl. 340-703.000.
Turtle, RObert R.: *See*—
Pagano, Thomas S.; and Turtle, RObert R., 4,929,040, Cl. 350-6.500.
Tury, Bernard, to Imperial Chemical Industries PLC. Grease composition. 4,929,369, Cl. 252-12.000.
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Midkiff, David G.; Rippl, Carl G.; Twyman, Nancy D.; and Wahlquist, Joseph D., 4,929,480, Cl. 428-35.600.
Tyers, Michael B.; Coates, Jan H.; Humber, David C.; Ewan, George B.; and Bell, James A., to Glaxo Group Limited. Medicaments. 4,929,632, Cl. 514-397.000.
Typpo, Pekka M., to Impact Systems, Inc. Thickness gauge for moving sheet material with inner and outer flexibly mounted bearings. 4,929,895, Cl. 324-231.000.
Tyrell, John A.; and McGready, Russell J., to General Electric Company. Polyoxyalkylene polyimide polymers. 4,929,716, Cl. 528-353.000.
Tzikas, Athanassios: *See*—
Schwander, Hansrudolf; Tzikas, Athanassios; and Aeschlimann, Peter, 4,929,719, Cl. 534-604.000.
U-Haul International: *See*—
Carty, William E., 4,929,018, Cl. 296-204.000.
Uarco Incorporated: *See*—
Henry, Paul T.; Haase, Roger L.; and Fitzgibbons, Gary W., 4,928,874, Cl. 229-74.000.
Ube Industries, Ltd.: *See*—
Koda, Akihide; Kita, Jun'ichiro; Kuroki, Yoshiaki; Fujiwara, Hiroshi; Takamura, Shinji; and Yamano, Kayoko, 4,929,618, Cl. 514-253.000.
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Uchida, Hiroshi: *See*—
Yamashita, Takaji; and Uchida, Hiroshi, 4,929,835, Cl. 250-367.000.
Uchida, Mamoru: *See*—
Nishimura, Yoshifumi; Yamamoto, Susumu; Nakata, Hidekazu; Murasoka, Kiyoshige; Uchida, Mamoru; and Taguchi, Takafumi, 4,929,512, Cl. 428-610.000.
Uda, Kazutaka: *See*—
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Udovich, Carl A.: *See*—
Hussmann, Gregory P.; and Udovich, Carl A., 4,929,761, Cl. 568-319.000.
Ueda, Kenichi; Hattori, Kouji; Terada, Akihiko; and Inohara, Kazuyoshi, to Oki Electric Industry Co., Ltd. Pressure-sensitive input apparatus. 4,929,934, Cl. 340-706.000.
Ueda, Masahiro: *See*—
Kitayama, Shinichiro; Adachi, Teruho; Ueda, Masahiro; Aoki, Yuichi; Shiiki, Satoshi; Takigawa, Akio; Yoshida, Motoaki; Imamura, Naoya; Maeda, Koichi; and Kayanoki, Hisayuki, 4,929,523, Cl. 430-4.000.
Ueda, Takashi: *See*—
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Uehara, Masao: *See*—
Matsui, Isamu; Uehara, Masao; Noshi, Shinji; and Kawarabashi, Tsukasa, 4,928,475, Cl. 57-264.000.
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Uematsu, Reppei: *See*—
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Matsui, Fumio; Suzuki, Noboru; Takaishi, Minoru; Ogura, Ryushi; Harigai, Noriaki; Hashimoto, Tadayoshi; and Uematu, Tomoe, 4,929,494, Cl. 428-286.000.
Uemura, Minoru: *See*—
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Uesugi, Akio; Dobashi, Ritsu; and Ohishi, Takeshi, to Fuji Photo Film Co., Ltd. Electrolytic treatment apparatus. 4,929,326, Cl. 204-206.000.
Uhlin, Per A. Surveillance installation. 4,929,927, Cl. 340-547.000.
Ukaji, Takao: *See*—
Sato, Mitsuya; Ukaji, Takao; Yamaguchi, Nobuhito; Ohmori, Taro; and Murakami, Eiichi, 4,929,893, Cl. 324-158.00F.
Un, Chong S.: *See*—
McLagan, Angus; Pao, Gei-Jon; Un, Chong S.; and Pearce, John J., Jr., 4,930,065, Cl. 364-200.000.
Underwood, Lowell A. Lift hitch. 4,929,028, Cl. 298-19.00R.
Undlin, Becky A. Toy & instructional apparatus. 4,929,181, Cl. 434-236.000.
Union Camp Corporation: *See*—
Avni, Eitan; Salama, Simon; and Turi, Eran, 4,929,474, Cl. 427-326.000.
Union Carbide Chemicals and Plastics Company Inc.: *See*—
Miller, David J.; Bryant, David R.; Billig, Ernst; and Shaw, Bernard L., 4,929,767, Cl. 568-454.000.
Partain, Emmett M., III; and Brode, George L., II, 4,929,722, Cl. 536-20.000.
Union Carbide Corporation: *See*—
Shen, Wei-Ming, 4,929,432, Cl. 423-344.000.
Sue, Jiinjen A.; and Troue, Harden H., 4,929,322, Cl. 204-192.380.
Union Carbide Industrial Gases Technology Inc.: *See*—
Lockett, Michael J.; and Victor, Richard A., 4,929,399, Cl. 261-112.200.
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Danilenko, Michael; Dekarske, Clarence W.; and Larson, John E., 4,930,106, Cl. 365-189.010.
Henze, Christopher P.; and Mulkern, Joseph H., 4,930,063, Cl. 363-91.000.
Wilson, Mark L., 4,929,050, Cl. 250-227.170.
United Kingdom Atomic Energy Authority: *See*—
Feest, Eric A.; Chesney, Peter F.; and Coombs, Jeffrey S., 4,928,745, Cl. 164-46.000.
United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the: *See*—
Freeman, Anthony; Blacknell, David; Quegan, Shaun; Ward, Ian A.; Oliver, Christopher J.; Finley, Ian P.; White, Richard G.; and Wood, James W., 4,929,950, Cl. 342-25.000.
U.S. Divers Company, Inc.: *See*—
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Batcho, Andrew D.; Horst, Ronald L.; and Uskokovic, Milan R., 4,929,609, Cl. 514-167.000.
Flint, Hollis M.; and Merkle, John R., 4,929,441, Cl. 424-84.000.
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Leonard, John F.; and Beam, Jerry E., 4,929,414, Cl. 419-2.000.
Lindsay, Mitchell H.; and Kerr, Walter B., 4,928,491, Cl. 60-734.000.
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Fansler, Kevin S.; and Lyon, David H., 4,928,573, Cl. 89-14.400.
Gold, Kenneth; and Brodman, Bruce, 4,929,552, Cl. 435-128.000.
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Ashley, Carol S.; and Reed, Scott T., 4,929,278, Cl. 106-287.120.
Dosch, Robert G.; and Stephens, Howard P., 4,929,582, Cl. 502-11.000.
Mullendore, Arthur W., 4,929,468, Cl. 427-47.000.
O'Connor, Daniel G.; and Gerth, Howard L., 4,928,532, Cl. 73-856.000.
Tiernan, Joan E., 4,929,359, Cl. 210-663.000.
Weingart, Richard C., 4,928,595, Cl. 102-202.700.
Higher Education: *See*—
Sekhar, Laligam N.; Scalbassi, Robert J.; Sun, Mingui; and Wasserman, Jacob F., 4,928,705, Cl. 128-773.000.
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DiVita, Sam; and Rast, Howard E., Jr., 4,929,837, Cl. 250-461.100.
Flesner, Larry D.; Eisenman, Welsey L.; Merriam, James D.; Bates, Richard L.; Dahle, Rolf N.; and Arrington, Douglas C., 4,929,831, Cl. 250-307.000.
Schneider, Alan M.; and Doherty, Donald W., 4,929,952, Cl. 342-184.000.
Sullivan, Edmund J.; and Stergiopoulos, Stergios, 4,930,111, Cl. 367-130.000.
Yoder, Max N., 4,929,986, Cl. 357-22.000.
Tennessee Reseearch Corporation: *See*—
Sekhar, Laligam N.; Scalbassi, Robert J.; Sun, Mingui; and Wasserman, Jacob F., 4,928,705, Cl. 128-773.000.
U.S. Philips Corporation: *See*—
Baxter, Thomas; and Barnes, Robert A., 4,930,120, Cl. 370-73.000.
Bird, Philip H.; Coe, David J.; Paxman, David H.; and Korteling, Aart G., 4,929,884, Cl. 323-313.000.
Blanken, Pieter G., 4,929,912, Cl. 330-288.000.
Bonnefous, Odile M. A., 4,928,698, Cl. 128-661.090.
Boudewijns, Arnoldus J. J., 4,929,998, Cl. 357-45.000.
Davies, Thomas J.; Seevinck, Evert; Pfennings, Leonardus C. M. G., deceased; Kennen, Henricus J.; Voss, Peter H.; O'Connell, Cormac M.; Phelan, Cathal G.; and Ontrop, Hans, 4,929,911, Cl. 330-264.000.
Dil, Jan G., 4,930,116, Cl. 369-275.100.
Hoeberechts, Arthur M. E.; and Peters, Petrus J. M., 4,929,999, Cl. 357-68.000.
Koster, Marinus P.; Van Der Hoek, Willem; Kemper, Nicolaas R.; and Soemers, Hermanus M. J. R., 4,929,146, Cl. 414-744.500.
Melwisch, Harald; and Schneider, Norbert, 4,928,389, Cl. 30-43.920.
Muller-Stute, Friedrich; and Weil, Gunter, 4,929,053, Cl. 350-96.340.
Rinneburger, Klaus P. K., 4,929,183, Cl. 439-67.000.
Ruitenburg, Leonardus J. M., 4,929,905, Cl. 329-358.000.
Verbeek, Willibrordus G. C.; Wijbenga, Hendrik; and Vossen-Bergmans, Marie-Madelene, 4,929,863, Cl. 313-113.000.
Verboom, Johannes J.; Baggen, Constant P. M. J.; Van Uijen, Cornelis M. J.; and Gaal, Erik W., 4,930,115, Cl. 369-59.000.
United Technologies: *See*—
Wiegand, Walter J.; Swindal, James L.; Swarts, Richard E.; Bullis, Robert H.; Lopiccolo, Mario T.; Grantham, Daniel H.; and Foyt, Arthur G., 4,930,042, Cl. 361-280.000.
Wiegand, Walter J., 4,930,043, Cl. 361-283.000.
United Technologies Automotive, Inc.: *See*—
Hansen, Randall F., 4,929,878, Cl. 318-560.000.
United Technologies Corporation: *See*—
Diebolt, Richard A.; Kidd, Stephen; and Rivers, Donald E., Jr., 4,929,130, Cl. 409-136.000.
Pollak, Robert R.; and Marcos, Juan A., 4,928,482, Cl. 60-39.161.
Shaffer, Harold K.; and Barnsby, Roger M., 4,928,978, Cl. 277-25.000.
Universal Medical Instrument Corp.: *See*—
Merry, Jack D.; and Fink, E. David, 4,929,235, Cl. 604-167.000.
Universidad Nacional Autonoma De Mexico: *See*—
Possani, Lourival D. P.; Gurrola, Georgina B.; Bayon, Marco A. A. C.; and Sitges, Maria B., 4,929,718, Cl. 530-326.000.
University of Akron: *See*—
Kennedy, Joseph P.; and Mishra, Munmaya K., 4,929,683, Cl. 525-268.000.
University of Alabama at Huntsville, The: *See*—
Wu, Maw-Kuen, 4,929,595, Cl. 505-1.000.
University of California, The Regents of the: *See*—
Anderson, William G., deceased; and Anderson, Johanna S., legal representative, 4,929,562, Cl. 436-126.000.
Hirschfeld, Tomas B., 4,929,561, Cl. 436-116.000.
Jennings, Glenn A., 4,930,102, Cl. 364-900.000.
University of Deleware: *See*—
Cogburn, Larry A., 4,929,600, Cl. 514-2.000.
University of Florida: *See*—
Drago, Russell S.; and Getty, Edward E., 4,929,800, Cl. 585-744.000.
Lampotang, Samsun; Gravenstein, Dietrich; Gravenstein, Joachim S.; Gravenstein, Nikolaus; and Banner, Michael J., 4,928,687, Cl. 128-207.140.
University of Georgia Research Foundation, Inc.: *See*—
Hamdy, Mostafa K., 4,929,452, Cl. 426-11.000.
University of Minnesota, Regents of the: *See*—
Allison, John D.; and Hanson, Gordon, 4,928,709, Cl. 128-782.000.

Liu, Benjamin Y. H.; and Szymanski, Wladyslaw W., 4,928,537, Cl. 73-863.860.
Schiffman, Eric L.; Fricton, James R.; and Espy, Lawrence M., 4,928,707, Cl. 128-774.000.
University of New Mexico: *See*—
Kirsch, Wolff M.; Zhu, Yong H.; and Cushman, Robert B., 4,929,240, Cl. 606-151.000.
University of Pittsburgh: *See*—
Kozikowski, Alan P.; and Xia, Yan, 4,929,731, Cl. 546-97.000.
University of Tennessee Research Corporation: *See*—
Lanier, Joel P.; Hall, Tamuel A.; and Moore, Kent R., 4,928,957, Cl. 272-72.000.
Uno, Yoshinobu: *See*—
Nakagawa, Sumio; Toiyama, Masaoki; Uno, Yoshinobu; and Kohda, Hiromichi, 4,929,768, Cl. 568-473.000.
Unrein, Edgar J.: *See*—
Henderson, Walter G.; Ellson, George A.; and Unrein, Edgar J., 4,929,880, Cl. 320-30.000.
UOP: *See*—
Barder, Timothy J., 4,929,796, Cl. 585-828.000.
Holcombe, Thomas C.; Sager, Thomas C.; Volles, Warren K.; and Zarchy, Andrew S., 4,929,799, Cl. 585-737.000.
James, Robert B., Jr.; and Kalnes, Tom N., 4,929,781, Cl. 585-310.000.
Moser, Mark D.; Lawson, R. Joe; Antos, George J.; Wang, Li; and Parulekar, Vivekanand N., 4,929,332, Cl. 208-65.000.
Moser, Mark D.; Lawson, R. Joe; Wang, Li; and Parulekar, Vivekanand N., 4,929,333, Cl. 208-65.000.
Pollastrini, Sheila; Bricker, Jeffery C.; and Frame, Robert R., 4,929,340, Cl. 208-189.000.
Schmidt, Robert J.; and Haizmann, Robert S., 4,929,794, Cl. 585-737.000.
Upjohn Company, The: *See*—
VanRheenen, Verlan H.; and Huber, Joel E., 4,929,395, Cl. 540-4.000.
Urai, Muneharu; Makino, Hiroyuki; and Shimada, Makoto, to Tachi-S Co., Ltd. Method for manufacturing automotive seat. 4,929,304, Cl. 156-245.000.
Urban, Milfred W. Mirror and bracket assembly. 4,929,074, Cl. 350-625.000.
Urmson, William T., Jr.; Gaslevic, Emeric; and Junk, Ronald K., to Harsco Corporation. Railroad spike holding apparatus with acute angled jaws. 4,928,600, Cl. 104-17.100.
Usami, Toshimasa; and Shimomura, Akihiro, to Fuji Photo Film Co., Ltd. Heat-sensitive recording material. 4,929,411, Cl. 503-213.000.
Ushiku, Kenichi: *See*—
Hayase, Isao; Ushiku, Kenichi; Tejima, Kunisuke; Hayashi, Seiichi; and Satoh, Kazuhiko, 4,929,159, Cl. 417-295.000.
Uskokovic, Milan R.: *See*—
Batcho, Andrew D.; Horst, Ronald L.; and Uskokovic, Milan R., 4,929,609, Cl. 514-167.000.
Usui, Katsumi: *See*—
Matsubara, Saburo; Ishi, Yoshihiro; Kobayashi, Seizo; and Usui, Katsumi, 4,929,680, Cl. 525-240.000.
Utica Enterprises, Inc.: *See*—
Dacey, Ernest A., Jr., 4,928,388, Cl. 29-798.000.
Uto, Kuniharu: *See*—
Tanaka, Hiroyuki; Uto, Kuniharu; Kawai, Kazumi; Shaura, Tsuneo; and Yasuhuku, Motonobu, 4,929,221, Cl. 474-205.000.
Uto, Nobutaka; Shido, Hironori; Saito, Jun; Hiroi, Masakazu; Kobayashi, Kenji; Murakami, Koichi; and Naito, Masataka, to Canon Kabushiki Kaisha. Sheet sorter with stapler. 4,928,941, Cl. 270-53.000.
Utterback, Jeffery J.; and Mecca, Randall S., to Harmon Industries, Inc. Detection of overheated railroad wheel and axle components. 4,928,910, Cl. 246-169.00A.
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Eguchi, Tamotsu; Oshiro, Takashi; Kuge, Yukihiro; Mochida, Kenichi; and Uwajima, Takayuki, 4,929,551, Cl. 435-106.000.
Vaez-Iravani, Mehdi: *See*—
Sicignano, Albert; and Vaez-Iravani, Mehdi, 4,929,836, Cl. 250-397.000.
Vahala, Kerry J.; and Hoenk, Michael E., to Johnston Pump/General Valve, Inc. Cathodoluminescence system for use in a scanning electron microscope including means for controlling optical fiber aperture. 4,929,041, Cl. 350-96.100.
Vaisala Oy: *See*—
Lehto, Ari; and Chen, Frank, 4,928,530, Cl. 73-756.000.
Valeo: *See*—
Despres, Dominique, 4,928,486, Cl. 60-338.000.
Valette, Serge, to Commissariat a l'Energie Atomique. Process for the production of light microguides with low optical propagation losses by multicoating deposition. 4,929,302, Cl. 156-657.000.
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Mayra-Makinen, Annika, 4,929,546, Cl. 435-29.000.
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Kaeding, Warren W.; and Valyocsik, Ernest W., 4,929,790, Cl. 585-651.000.
van Broekhoven, Johannes A. M., to Shell Oil Company. Hydrogenation of CO/olefin copolymer. 4,929,701, Cl. 525-539.000.
van Calker, Freerk R., to Akzo NV. Conveyor belt of PVC provided with a compound layer of reinforcing material and a process of weaving said reinforcing layer. 4,928,812, Cl. 198-847.000.
Van Coney, Robert H.: *See*—
Meyer, Eric W.; and Van Coney, Robert H., 4,929,410, Cl. 264-533.000.
Vandenbergh, Peter A.; Pucci, Michael J.; Kunka, Blair S.; and Vedamuthu, Ebenezer R., to Microlife Technics, Inc. Method for inhibiting *Listeria monocytogenes* using a bacteriocin. 4,929,445, Cl. 424-115.000.
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Van Der Hoek, Willem: *See*—
Koster, Marinus P.; Van Der Hoek, Willem; Kemper, Nicolaas R.; and Soemers, Hermanus M. J. R., 4,929,146, Cl. 414-744.500.
Van Der Poel, Robert J.; and Wantz, Armand, to Goodyear Tire & Rubber Company, The. Tire building drum including an expandable segmental cylinder assembly and a vacuum chamber. 4,929,298, Cl. 156-414.000.
Vandersluis, Ron; and Quittner, Erik, to Canada, National Research Council of Canada/Conseil National de Reserches du. End effector. 4,929,009, Cl. 294-2.000.
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Van Der Walt, Nicholaas T., to Crucible Societe Anonyme. Method and apparatus for detecting cross sectional area variations in a elongate object by measuring radial magnetic flux variations using spaced-apart coils. 4,929,897, Cl. 324-240.000.
Vandevier, Joseph E., to Baker Hughes Incorporated. Cable suspended pumping system. 4,928,771, Cl. 166-385.000.
Van Diemen, Paul: *See*—
Dixon, Robert C.; Cearley, James E.; Van Diemen, Paul; Sayre, Edwin D.; and Gordon, Gerald M., 4,929,412, Cl. 376-260.000.
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Lodder, Bernhard; Severiens, Hendrik; van Houten, Jan A.; and van Dijk, Berend J., 4,929,408, Cl. 264-149.000.
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Green, Stephen T.; and Van Hoye, Willibald, 4,928,800, Cl. 190-115.000.
VanKirk, Raymond J. Golf swing trainer. 4,928,974, Cl. 273-186.00R.
van Mondfrans, Gerardus H.; and de Vries, Pieter, to Stork Brabant B.V. Method for controlling the passage of fabric through a rotary screen printing installation. 4,928,585, Cl. 101-129.000.
Vano, Barbara; and Vano, Bruno. Word question association game. 4,928,976, Cl. 273-240.000.
Vano, Bruno: *See*—
Vano, Barbara; and Vano, Bruno, 4,928,976, Cl. 273-240.000.
VanRheenen, Verlan H.; and Huber, Joel E., to Upjohn Company, The. 16α-methylation process. 4,929,395, Cl. 540-4.000.
Van Schaack, Wilbur B. Lane marker steering guide. 4,928,393, Cl. 33-264.000.
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Verboom, Johannes J.; Baggen, Constant P. M. J.; Van Uijen, Cornelis M. J.; and Gaal, Erik W., 4,930,115, Cl. 369-59.000.
van Vuuren, Willem N. J.; and Wakeman, Russell J., to Siemens-Bendix Automotive Electronics L.P. Autocalibration of camshaft phasing feedback in a variable valve timing system. 4,928,640, Cl. 123-90.170.
Vari-Prop, Inc.: *See*—
Pitt, Donald R., 4,929,201, Cl. 440-50.000.
Varian Associates, Inc.: *See*—
Costello, Kenneth A.; and MacMillan, Hugh F., 4,929,867, Cl. 313-525.000.
Varma, Anujan M.; and Georgiou, Christos J., to International Business Machines Corporation. High-speed switching system with flexible protocol capability. 4,929,939, Cl. 340-825.800.
Vaught, Michael. Electrically lighted ornament. 4,930,053, Cl. 362-121.000.
VDO Adolf Schindling AG: *See*—
Schult, Klaus; Kister, Horst; and Quenzer, Michael, 4,928,531, Cl. 73-855.000.
Vedamuthu, Ebenezer R.: *See*—
Vandenbergh, Peter A.; Pucci, Michael J.; Kunka, Blair S.; and Vedamuthu, Ebenezer R., 4,929,445, Cl. 424-115.000.
Veech, Richard L. Containers for redox active electrolytes and method of using same. 4,929,449, Cl. 424-700.000.
Vehicle Safety Controls, Inc.: *See*—
Frederick, Earl, 4,928,519, Cl. 73-126.000.
Veijo, Vainino: *See*—
Paakkonen, Taisto; Veijo, Vainino; and Jarkko, Turpeinen, 4,929,019, Cl. 296-223.000.
Veitenhansl, Rudolf; Froeschke, Wolfgang; and Piorr, Robert, to Henkel Kommanditgesellschaft auf Aktien. Ether sulfonates as antistatic agents. 4,929,504, Cl. 428-395.000.
Velbon International Corporation: *See*—
Nakatani, Kouichiro, 4,929,973, Cl. 354-293.000.
Venier, Clifford G.; and Casserly, Edward W., to Pennzoil Products Company. Lubricants comprising novel cyclopentanes, cyclopentadienes, cyclopentenes, and mixtures thereof and methods of manufacture. 4,929,782, Cl. 585-375.000.
Venuti, Michael C.: *See*—
Castelhano, Arlindo L.; DeYoung, Lawrence M.; Krantz, Alexander; Pliura, Diana H.; and Venuti, Michael C., 4,929,630, Cl. 514-380.000.

Verbatim Corporation: *See*—
Sander, Ingolf, 4,929,067, Cl. 350-421.000.

Verbeek, Willibrordus G. C.; Wijbenga, Hendrik; and Vossen-Bergmans, Marie-Madelene, to U.S. Philips Corporation. High-pressure gas discharge lamp and luminaire provided with said lamp. 4,929,863, Cl. 313-113.000.

Verboom, Johannes J.; Baggen, Constant P. M. J.; Van Uijen, Cornelis M. J.; and Gaal, Erik W., to U.S. Philips Corp. Method of and device for recording information, record carrier, and device for reading the recorded information. 4,930,115, Cl. 369-59.000.

Vermeule, Jacob: *See*—
De Jong, Feike; Dannenberg, Willem; and Vermeule, Jacob, 4,929,374, Cl. 252-39.000.

Vermeulen-Hollandia Octrooien II B.V.: *See*—
Huyer, Johannes N., 4,928,547, Cl. 74-545.000.

Verpoort, Clemens: *See*—
Meyer, Gundolf; Schonfeld, Erwin; and Verpoort, Clemens, 4,929,596, Cl. 505-1.000.

Vesper Corporation: *See*—
Neiman, Richard D., 4,928,834, Cl. 211-191.000.

Vetco Gray Inc.: *See*—
Milberger, Lionel J.; Nobileau, Philippe C.; and Watkins, Bruce J., 4,928,769, Cl. 166-382.000.

Viana, Luis M.; Cuozzo, Robert A.; Miceli, Michael L.; and Whitney, Kent A., to Raytheon Company. Radio frequency limiter circuit. 4,930,035, Cl. 361-54.000.

Vic, Raymond: *See*—
Dubots, Patrick; Legat, Denis; and Vic, Raymond, 4,929,047, Cl. 350-96.230.

Vicari, Richard: *See*—
Aslam, Mohammad; Vicari, Richard; and Davenport, Kenneth G., 4,929,694, Cl. 526-262.000.

Victor Company of Japan, Ltd.: *See*—
Nakamura, Nobuaki; Hirose, Yukimi; Kai, Masakatsu; and Itonaga, Makoto, 4,929,822, Cl. 250-201.400.
Yamada, Hiroshi; Nakano, Ryo; Matsuo, Yasutoshi; and Mikami, Seiichi, 4,930,005, Cl. 358-36.000.

Victor, Richard A.: *See*—
Lockett, Michael J.; and Victor, Richard A., 4,929,399, Cl. 261-112.200.

Vignotto, Angelo: *See*—
Colanzi, Franco; and Vignotto, Angelo, 4,928,371, Cl. 29-898.064.

Villani, Jean P.: *See*—
Butler, David R.; Snow, Geo.ge; Sandford, Philip; Neu, Max G.; Villani, Jean P.; Teyss. re, Alain; and Lenoir, Roland, 4,928,746, Cl. 164-362.000.

Vilanyi, Tibor J.; and Westerson, Kevin W., to Cummins Engine Company, Inc. Dual acting-double breakover throttle lever. 4,928,647, Cl. 123-400.000.

Vincent, Gary A.; Sylvester, Judith M.; and Vincent, Harold L., to Dow Corning Corporation. Quaternary ammonium salt of an alkoxysilane as a dispersant for magnetic pigment. 4,929,376, Cl. 252-62.560.

Vincent, Harold L.: *See*—
Vincent, Gary A.; Sylvester, Judith M.; and Vincent, Harold L., 4,929,376, Cl. 252-62.560.

Vinciguerra, Constantino; and Coppini, Massimo, to Nuovopignone-Industrie Meccaniche e Fonderia, S.p.A. System for disengageably coupling a rotor body to the shaft of rotary machines, in particular gas turbines and rotary dobbies. 4,929,119, Cl. 403-359.000.

Vinokur, Bertold B.: *See*—
Tikhonovich, Vadim I.; Pavljuk, Vladimir D.; Vinokur, Bertold B.; Kondratjuk, Stanislav E.; Lutsenko, Georgy G.; Edemsky, Vladimir K.; Kiselev, Vladimir B.; Karasev, Nikolai M.; and Myakishev, Anatoly K., 4,929,416, Cl. 420-12.000.

Virginia Polytechnic Institute and State University: *See*—
Gibson, Harry W.; and Jois, Yajnanarayana H. R., 4,929,713, Cl. 528-230.000.

Virkola, Nils E.: *See*—
Kiiskila, Erkki J.; and Virkola, Nils E., 4,929,307, Cl. 159-47.300.

Visual Ease, Inc.: *See*—
Blum, Jerome V., 4,929,865, Cl. 313-478.000.

Vitt, Burckard: *See*—
Breidenbach, Dieter; Oldengott, Hans; and Vitt, Burckard, 4,929,179, Cl. 432-247.000.

Voest-Alpine Automotive Gesellschaft M.B.H.: *See*—
Kronberger, Maximilian H., 4,928,886, Cl. 239-533.500.

Vogel, Peter S. Selective video playing system. 4,930,158, Cl. 380-5.000.

Vogel, Peter S. Automatic censorship of video programs. 4,930,160, Cl. 380-23.000.

Voigt, Dean J. Honda breakaway. 4,928,634, Cl. 119-153.000.

Vold, Barbara S., to SRI International. Reagents, methods, and test kit for diagnosing/monitoring cancer in humans. 4,929,544, Cl. 435-6.000.

Volk, Joseph A., Jr., to Beta Raven, Inc. Apparatus for a pellet mill without steam addition. 4,929,163, Cl. 425-143.000.

Volles, Warren K.: *See*—
Holcombe, Thomas C.; Sager, Thomas C.; Volles, Warren K.; and Zarchy, Andrew S., 4,929,799, Cl. 585-737.000.

Volodchenko, Dmitry B.: *See*—
Kljuev, Vladimir V.; Kozlov, Valery S.; Volodchenko, Dmitry B.; Stepanenko, Alexandr V.; Baranovsky, Vladimir I.; Korolkov, Mikhail I.; and Semenov, Orest S., 4,930,026, Cl. 360-67.000.

von Ballmoos, Roland: *See*—
Tsao, Ying-Yen P.; and von Ballmoos, Roland, 4,929,576, Cl. 502-35.000.

von Dadelszen, Michael: *See*—
Sergoyan, Edward G.; and von Dadelszen, Michael, 4,930,137, Cl. 372-81.000.

von Gizycki, Ulrich: *See*—
Mazanek, Jan; von Gizycki, Ulrich; Muller, Hanns P.; Wienkenhover, Martin; Wieser, Karl-Heinz; Paulat, Volker; Theuer, Werner; and Muller, Walter, 4,929,705, Cl. 528-49.000.

Von Platen, Magnus H. Method for recovering latent heat from a heat transfer medium. 4,928,752, Cl. 165-104.170.

Vorreiter, John W.; and Dean, Robert L., to Perkin-Elmer Corporation, The. Passive electrostatic vacuum particle collector. 4,929,139, Cl. 414-217.000.

Vortab Corporation: *See*—
Smith, Charles R., 4,929,088, Cl. 366-337.000.

Voss, Peter H.: *See*—
Davies, Thomas J.; Seevinck, Evert; Pfemmings, Leonardus C. M. G., deceased; Kennen, Henricus J.; Voss, Peter H.; O'Connell, Cormac M.; Phelan, Cathal G.; and Ontrop, Hans, 4,929,911, Cl. 330-264.000.

Vossen-Bergmans, Marie-Madelene: *See*—
Verbeek, Willibrordus G. C.; Wijbenga, Hendrik; and Vossen-Bergmans, Marie-Madelene, 4,929,863, Cl. 313-113.000.

Voyce, Kenneth G.; and McCandless, Jay H., to Boeing Company, The. Amplifier linearization using down/up conversion. 4,929,906, Cl. 330-149.000.

Vujevic, Aleksandar: *See*—
Torbus, Marek; Jerman, Franz; Ladegourdie, Gerard; Lingemann, Dirk; Seiss, Willi; and Vujevic, Aleksandar, 4,929,649, Cl. 523-145.000.

Vukov, Rastko: *See*—
Anderson, Norman S.; Promislow, Albert L.; Rayborn, Randy L.; and Vukov, Rastko, 4,929,769, Cl. 568-614.000.

Vulich, Yordan: *See*—
Ramos, Rolando P.; Loreto, Wilfredo P.; and Vulich, Yordan, 4,928,439, Cl. 51-284.00E.

W.R. Grace & Co.-Conn.: *See*—
Berneburg, Philip L.; and Rice, Roy W., 4,928,645, Cl. 123-188.0AA.
Hegedus, Louis; Beeckman, Jean W.; Pan, Wie-Hin; and Solar, Jeffrey P., 4,929,586, Cl. 502-217.000.
Heifetz, Aaron H.; Wolfe, Richard A.; Braatz, James A.; and Luthra, Narender P., 4,929,706, Cl. 528-49.000.
Schirmer, Henry G., 4,928,474, Cl. 53-425.000.
Whittenberger, William A., 4,928,485, Cl. 60-299.000.
Wormsbecher, Richard F., 4,929,338, Cl. 208-120.000.

W. Schlafhorst & Co.: *See*—
Kalitzki, Siegfried; Peters, Josef; and Schurmann, Gottfried, 4,928,477, Cl. 57-416.000.
Wey, Edmund, 4,928,895, Cl. 242-35.50A.
Wirtz, Ulrich; and Engelhardt, Dietmar, 4,928,903, Cl. 242-130.000.

WABCO Westinghouse Fahrzeugbremsen GmbH: *See*—
Binarsch, Jurgen; Bode, Jurgen; Danne, Lutz; and Lissel, Norbert, 4,930,040, Cl. 361-154.000.

Waber, Rene: *See*—
Demuth, Robert; Staheli, Paul; Waber, Rene; Grundler, Christoph; and Machler, Franz, 4,928,353, Cl. 19-65.00A.

Wachendorff-Neumann, Ulrike: *See*—
Lindner, Werner; Becker, Benedikt; Steffens, Robert; Wachendorff-Neumann, Ulrike; Brandes, Wilhelm; Stendel, Wilhelm; and Dutzmann, Stefan, 4,929,642, Cl. 514-510.000.

Wacker-Chemie GmbH: *See*—
Burger, Christa; Muller, Johann; and Bosch, Erhard, 4,929,647, Cl. 522-99.000.

Wacker, Thomas P.; and Zabinski, Raymond J., to General Electric Company. Method of bonding using UV curable epoxy resin compositions with delayed cure. 4,929,305, Cl. 156-273.300.

Wada, Hiroshi: *See*—
Yoshida, Masaru; Yoshikawa, Mitsuhiko; Yoshimoto, Yoshikazu; Wada, Hiroshi; Suzuki, Tomonari; and Nakajima, Shigeo, 4,929,803, Cl. 174-117.00M.

Wada, Shunichi: *See*—
Harara, Mitsuhiko; Takizawa, Shozo; Tanaka, Tadao; and Wada, Shunichi, 4,930,082, Cl. 364-424.050.

Waddell, Troy: *See*—
Walker, Jerry; and Waddell, Troy, 4,928,864, Cl. 224-162.000.

Wade, Mark G.; and Kenaston, Kenneth R. Rotary screw fish collector. 4,929,350, Cl. 210-157.000.

Wadlington, James C.: *See*—
Slack, William F.; and Wadlington, James C., 4,930,061, Cl. 363-44.000.

Waelti, Werner, to Werkzeugmaschinenfabrik Tschudin. Means and method for resetting a cylindrical grinding machine. 4,928,437, Cl. 51-165.710.

Wagh, Vijay N.: *See*—
Walton, Paul B.; Keough, James; Demers, Richard L.; Denny, Leland A., Jr.; Kaiser, Robert E.; Moses, Cornellius, Jr.; and Wagh, Vijay N., 4,930,151, Cl. 379-94.000.

Wagner, Georg: *See*—
Strate, Rudiger; Schulze, Rainer; Schnatwinkel, Michael; Wagner, Georg; Wilmes, Manfred; Haller, Bernd; Herkner, Ernst; Diekmann, Jorg; and Henning, Herbert, 4,929,198, Cl. 439-709.000.

Wagner, John T. Variable-inertia flywheels and transmission. 4,928,553, Cl. 475-268.000.

Wagner Spray Tech Corporation: *See*—
Walsh, Warren J.; and Kallevig, Bruce, 4,928,722, Cl. 137-881.000.

Wahlquist, Joseph D.: *See*—
Midkiff, David G.; Rippl, Carl G.; Twyman, Nancy D.; and Wahlquist, Joseph D., 4,929,480, Cl. 428-35.600.

Waineo, Glenn. Walking beam apparatus. 4,928,811, Cl. 198-774.000.

Wakabayashi, Hideaki, to Aisin Seiki Kabushiki Kaisha. Free wheel hub clutch. 4,928,804, Cl. 192-83.000.

Wakasugi, Nobuo: *See*—
Hatakeyama, Motonobu; Yoshimura, Kohtaroh; Naoi, Hidenori; and Wakasugi, Nobuo, 4,930,089, Cl. 361-519.000.

Wakatsuki, Yoshio: *See*—
Shimizu, Giichiro; Shimizu, Misao; Takeuchi, Hajime; Okuyama, Toshiharu; and Wakatsuki, Yoshio, 4,930,096, Cl. 364-550.000.

Wakayama, Sachio; Ishikawa, Fumiyasu; and Oishi, Kunio, to Kibun Co., Ltd. Substance GIF-2 and process for production of the same. 4,929,548, Cl. 435-71.200.

Wakeman, Russell J.: *See*—
van Vuuren, Willem N. J.; and Wakeman, Russell J., 4,928,640, Cl. 123-90.170.

Wakimoto, Zenji; and Hayashi, Takahisa, to Dainippon Screen Mfg. Co., Ltd. Telecentric image-forming optical system for large image size. 4,929,066, Cl. 350-415.000.

Walbro Corporation: *See*—
Auselin, Brian K., 4,928,657, Cl. 123-514.000.

Walker, Hans: *See*—
Pegel, Karl H.; and Walker, Hans, 4,929,603, Cl. 514-26.000.

Walker, Jerry; and Waddell, Troy. Hand clasp tape dispenser. 4,928,864, Cl. 224-162.000.

Walker, Laura B.: *See*—
Walker, Robert M., Jr.; Walker, Robert M., Sr.; and Walker, Laura B., 4,928,425, Cl. 47-18.000.

Walker, Robert M., Jr.; Walker, Robert M., Sr.; and Walker, Laura B. Greenhouse with integral humidifier. 4,928,425, Cl. 47-18.000.

Walker, Robert M., Sr.: *See*—
Walker, Robert M., Jr.; Walker, Robert M., Sr.; and Walker, Laura B., 4,928,425, Cl. 47-18.000.

Wallace Computer Services, Inc.: *See*—
Dash, Thomas E., 4,928,940, Cl. 270-1.100.

Wallace, W. Edward; Smith, H. Kevin; Lynch, W. Bryan; Craig, Raymond S.; and Pourarian, Fiaz, to Advanced Materials Corporation. Hydrogen heat pump. 4,928,496, Cl. 62-46.200.

Wallerstorfer, Kurt: *See*—
Kocznar, Wolfram; and Wallerstorfer, Kurt, 4,929,821, Cl. 235-493.000.

Wallner, Anders: *See*—
Lundgren, Bengt; and Wallner, Anders, 4,930,143, Cl. 378-37.000.

Walmsley, Robert G.: *See*—
Natarajan, Bangalore R.; and Walmsley, Robert G., 4,929,514, Cl. 428-611.000.

Walsh, Joseph C., to Adolph Coors Company. Packaging alignment system. 4,929,223, Cl. 493-56.000.

Walsh, Warren J.; and Kallevig, Bruce, to Wagner Spray Tech Corporation. Pressure relief after electric shut-off of pump. 4,928,722, Cl. 137-881.000.

Walter, Jurgen: *See*—
Lunke, Manfred; Falz, Ulrich; and Walter, Jurgen, 4,929,115, Cl. 403-228.000.

Walters, Dale E. Folding sign. 4,928,415, Cl. 40-610.000.

Walters, Darrell L.; and Larsen, Steven D. Reversible clam shell bucket. 4,928,410, Cl. 37-117.500.

Walters, David A. Robotic devices. 4,928,546, Cl. 74-479.000.

Walton, Paul B.; Keough, James; Demers, Richard L.; Denny, Leland A., Jr.; Kaiser, Robert E.; Moses, Cornellius, Jr.; and Wagh, Vijay N., to General Electric Company. Telephone call forwarding device. 4,930,151, Cl. 379-94.000.

Wamser, Christian A.: *See*—
Boghean, Barry J.; Subbanna, Somanahalli N.; Redmos, Charles L.; and Wamser, Christian A., 4,929,435, Cl. 423-484.000.

Wanami, Hideki: *See*—
Suzuki, Kiyosuke; and Wanami, Hideki, 4,930,008, Cl. 358-75.000.

Wang, Kuen-Yi. Golf club head surveying instrument. 4,928,397, Cl. 33-508.000.

Wang, Li: *See*—
Moser, Mark D.; Lawson, R. Joe; Antos, George J.; Wang, Li; and Parulekar, Vivekanand N., 4,929,332, Cl. 208-65.000.
Moser, Mark D.; Lawson, R. Joe; Wang, Li; and Parulekar, Vivekanand N., 4,929,333, Cl. 208-65.000.

Wang, Ming-I. Gas lighter with spark ignition. 4,929,174, Cl. 431-276.000.

Wang, Richard H. S.; and Myers, Garry L., to Eastman Kodak Company. Cyclic phosphites and stabilized polymeric compositions. 4,929,654, Cl. 524-117.000.

Wang, Samuel S.; and Nagarai, D. R., to American Cyanamid Company. Novel collectors and processes for making and using same. 4,929,343, Cl. 209-166.000.

Waniczek, Helmut: *See*—
Meurer, Kurt P.; Waniczek, Helmut; Sylvester, Gerd; and Witte, Josef, 4,929,689, Cl. 525-333.900.

Wanner, Edward A.: *See*—
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Wantz, Armand: *See*—
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Ward, Edwin J.; and Ward, Thomas C., II. High current capacity electrical corrosive electrolyte battery electrical interconnection system. 4,929,522, Cl. 429-178.000.

Ward, Ian A.: *See*—
Freeman, Anthony; Blacknell, David; Quegan, Shaun; Ward, Ian A.; Oliver, Christopher J.; Finley, Ian P.; White, Richard G.; and Wood, James W., 4,929,950, Cl. 342-25.000.

Ward, Julia M.: *See*—
Hayden, Joseph S.; Sapak, David L.; and Ward, Julia M., 4,929,387, Cl. 252-301.40P.

Ward, Thomas C., II: *See*—
Ward, Edwin J.; and Ward, Thomas C., II, 4,929,522, Cl. 429-178.000.

Warman, Eugene C.: *See*—
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Warner-Lambert Company: *See*—
Chucholowski, Alexander W.; Roth, Bruce D.; and Sliskovic, Drago R., 4,929,620, Cl. 514-269.000.
Coughenour, Linda L.; Davis, Robert E.; Downs, David A.; Heffner, Thomas G.; Meltzer, Leonard T.; Moos, Walter H.; Moreland, David W.; and Tecle, Haile, 4,929,734, Cl. 546-338.000.
Culbertson, Townley P.; Domagala, John M.; Hagen, Susan E.; and Sanchez, Joseph P., 4,929,613, Cl. 514-210.000.
Sharma, Shri C.; Shaw, James J.; and Yang, Robert K., 4,929,508, Cl. 424-439.000.
Yang, Robert K., 4,929,447, Cl. 424-440.000.

Warner & Swasey Company, The: *See*—
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Wasco Products, Inc.: *See*—
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Washburn, Robert M.; and Dodson, Jerry D., to Acurex Corporation. Carbon-carbon composite structural assemblies and methods of making the same. 4,929,505, Cl. 728-408.000.

Wasserman, Harry H.; Murugesan, Natesan; and Van Duzer, John H., to Yale University. Vinyl tricarbonyl compounds and methods of making the same. 4,929,751, Cl. 560-174.000.

Wasserman, Jacob F.: *See*—
Sekhar, Laligam N.; Scalbassi, Robert J.; Sun, Mingui; and Wasserman, Jacob F., 4,928,705, Cl. 128-773.000.

Watabe, Mitsuru: *See*—
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Watanabe, Kazuyoshi: *See*—
Ishikawa, Osamu; and Watanabe, Kazuyoshi, 4,928,803, Cl. 192-58.00B.

Watanabe, Shoichi: *See*—
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Watanabe, Tadahiko; Shobu, Kazuhisa; Kai, Yukio; Yamamoto, Hideki; Sudoh, Eiichi; Yagishita, Osamu; and Hayakawa, Junshiro, to Agency of Industrial Science and Technology. Method of manufacture metal diboride ceramics. 4,929,417, Cl. 419-12.000.

Watanabe, Tomomi: *See*—
Shinya, Yoshiyuki; Tabara, Yoshitaka; Okuno, Itaru; Kaneko, Tadashi; and Watanabe, Tomomi, 4,928,652, Cl. 123-417.000.

Watanabe, Tsutomu; Sagiyama, Masari; Kawabe, Masaki; Tsujihara, Toshiyuki; and Takushima, Shigehiro, to NKK Corporation. Apparatus for removing electroplating metal deposited onto surface of conductor roll. 4,929,323, Cl. 204-206.000.

Watanabe, Tsutomu; Sagiyama, Masaru; Kawabe, Masaki; Tsujihara, Toshiyuki; and Takushima, Shigehiro, to NKK Corporation. Apparatus for removing electroplating metal deposited onto surface of conductor roll. 4,929,324, Cl. 204-206.000.

Watanabe, Yasuhiko: *See*—
Maruta, Keiichi; Ueda, Takashi; and Watanabe, Yasuhiko, 4,929,590, Cl. 503-207.000.

Waterville TG, Inc.: *See*—
Kuzuhara, Michio; Shibasaki, Jun; St. Louis, Andree; St. Laurent, Christian; and Bedard, Michel, 4,928,431, Cl. 49-479.000.

Watkins, Bruce J.: *See*—
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Watson, John C.; Gaskill, Stephen P.; Russell, David F.; and Burns, Robert L. D., to Lucas Industries public limited company. Disc for disc brakes. 4,928,798, Cl. 188-218.0XL.

Watson, Keith G.; Drygala, Peter; and Bell, Stephen, to ICI Australia Operations Proprietary Limited. Herbicidal sulfonomides. 4,929,269, Cl. 71-92.000.

Watts, Robert M., to Boeing Company, The. Gap, overwind, and lead angle sensor for fiber optic bobbins. 4,928,904, Cl. 242-158.00R.

Waynick, John A., to Amoco Corporation. Steel mill grease. 4,929,371, Cl. 252-25.000.

Weaver, Christopher A.: *See*—
Shadzi, Bahram; and Weaver, Christopher A., 4,929,499, Cl. 428-336.000.

Weaver, Edgar N., Jr.: *See*—
Perry, Ralph; and Weaver, Edgar N., Jr., 4,928,973, Cl. 273-176.00A.

Weaver, Frank C., to Stewart Warner Instrument Corporation. Universal fuel sender. 4,928,526, Cl. 73-313.000.

Webb, Frances C.: *See*—
Langston, Richard D.; Webb, Frances C.; and McBeath, Simon C., 4,928,681, Cl. 128-156.000.

Webber Gage Division of L.S.: *See*—
Webber, George B., 4,929,082, Cl. 356-358.000.

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White, Jerry H. Fire sprinkler head jig. 4,928,773, Cl. 169-37.000.
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Williams, Jack L., to ITT Corporation. Searchlight drive means and apparatus. 4,930,057, Cl. 362-272.000.
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Woods, William A., to Spirotron Corporation. Pendulum mounted airbrush. 4,928,625, Cl. 118-323.000.

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Yaguchi, Yoshinori; Kubota, Masahiro; and Nakaminami, Masamitsu, to Kabushiki Kaisha Mori Seiki Seisikusho. Automatic tool changer. 4,928,381, Cl. 29-568.000.

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Nagao, Takeyoshi; and Kohashi, Toru, 4,928,473, Cl. 53-53.000.
Yamatsu, Isao: *See*—
Abe, Shinya; Miyamoto, Mitsuaki; Tanaka, Masayuki; Akasaka, Kozo; Hayashi, Kenji; Kawahara, Tetsuya; Katayama, Satoshi; Sakuma, Yoshinori; Suzuki, Takeshi; and Yamatsu, Isao, 4,929,623, Cl. 514-293.000.
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Meier, Werner; Rambeck, Walter A.; Weiser, Harald; and Zucker, Hermann, 4,929,610, Cl. 514-167.000.

Zusy, Matthew S. Apparatus for manipulating compact disc jewel boxed. 4,928,816, Cl. 206-232.000.

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NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

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Zebuhr, William H., Re. 33,222, Cl. 122-13.00R.

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Jonas, Friedrich; and Hocker, Jurgen, Re. 33,223, Cl. 252-518.000.

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Ajaxon, Bengt M.: *See*—
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von Gunten, Marc K.; Cook, Benjamin H.; and Gerstenberger, David C., B1 4,615,034, Cl. 372-99.000.

Ellul, Raymond M.: *See*—
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Logan, David J., B1 4,591,999, Cl. 364-523.000.

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Moyle, Brian D.: *See*—
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Aspects, Inc.: *See*—
Bescherer, Robert E.; and Colvin, Barry D., 308,173, Cl. D10-57.000.
Auman, Debora S. Can cap. 308,169, 5-29-90, Cl. D9-446.000.
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Blacker, Allan. Combined perpetual calendar and file. 308,224, 5-29-90, Cl. D19-21.000.
Boat America Corporation: *See*—
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Buchanan, Carroll A. Reclosable coupling for a fishing line, or the like. 308,240, 5-29-90, Cl. D22-134.000.
Buckley, Francis D., to Delmed, Inc. Peritoneal dialysis machine. 308,249, 5-29-90, Cl. D24-8.000.
Bulgari, Paolo, to Partecipazioni Bulgari S.p.A. Earring or similar article. 308,180, 5-29-90, Cl. D11-76.000.
Burkarth, Jack, to Gulton Industries, Inc. Fluorescent lighting fixture. 308,259, 5-29-90, Cl. D26-78.000.
Burke, David W., to Motion Controls and Automation, Inc. Fluid-operated multimotion actuator. 308,207, 5-29-90, Cl. D15-7.000.
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Canon Kabushiki Kaisha: *See*—
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Cedergrees, Steven D., to Tempress Incorporated. Lure retriever handle. 308,242, 5-29-90, Cl. D22-149.000.
Chapin, David S.; and Humphrey, William C., to Cooper Industries, Inc. Base for storing and carrying a propane torch and accessories. 308,136, 5-29-90, Cl. D3-73.000.
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Edwards, Lewis H. Coin stacking and counting stand. 308,278, 5-29-90, Cl. D99-34.000.
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Fish, Thomas E., Jr., to Little Tikes Company, The. Construction toy window block. 308,234, 5-29-90, Cl. D21-108.000.
Flores, Ralph. Lamp globe. 308,262, 5-29-90, Cl. D26-131.000.
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Harris, Charles M. End portions of a double-ended wrench. 308,158, 5-29-90, Cl. D8-21.000.
Heap, Jean W., to Pendelfin Studios Limited. Table ornament. 308,183, 5-29-90, Cl. D11-158.000.
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Redmann, David B.; and Redmann, Lee E. A., 308,264, Cl. D28-7.000.

Redmond, John K., to Johnson & Johnson Consumer Products, Inc. Toothbrush. 308,138, 5-29-90, Cl. D4-104.000.

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Tholberg, Elizabeth H.: *See*—
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Totsuka, Keiichi: *See*—
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CLASSIFICATION OF PATENTS

ISSUED MAY 29, 1990

NOTE.—First number, class; second number, subclass; third number, patent number

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19	4,928,320
84	4,928,321
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CLASS 4

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395	4,928,327
420	4,928,328
552	4,928,329
562	4,928,330

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338	4,928,346
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CLASS 17

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CLASS 19

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97	4,928,354
109	4,928,355
129 R	4,928,356
225	4,928,357

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71 J	4,928,359
90 R	4,928,362
235	4,928,360
390	4,928,363
431	4,928,358
614	4,928,364
635	4,928,365
641	4,928,366
705	4,928,367

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1.22	4,928,368
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243.5	4,928,370
278	4,928,373
436	4,928,374
509	4,928,375
530	4,928,376
560	4,928,377
564.6	4,928,378
566.3	4,928,379
	4,928,380
568	4,928,381
603	4,928,382
623	4,928,384
623.5	4,929,251
711	4,928,383
788	4,928,385
798	4,928,388
824	4,928,386
840	4,928,387
890.08	4,928,372
898.064	4,928,371

CLASS 30

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123.4	4,928,390
293	4,928,391

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264	4,928,393
265	4,928,394
374	4,928,395
503	4,928,396
508	4,928,397
512	4,928,398
562	4,928,399
605	4,928,400
645	4,928,401

CLASS 34

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37	4,928,404
50	4,928,405
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119	4,928,407
	4,928,408

CLASS 37

9	4,928,409
117.5	4,928,410

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324	4,928,411
	4,928,412
511	4,928,413
551	4,928,414
610	4,928,415
618	4,928,416
642	4,928,417

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3	4,928,418
17	4,928,419
27.4	4,928,420
36	4,928,421
42	4,928,422
43.16	4,928,423

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53	4,929,252
76	4,929,253

CLASS 47

1.01	4,928,424
18	4,928,425
48.5	4,928,426
58	4,928,427

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197 R	4,929,255

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192	4,928,428
460	4,928,430
479	4,928,431

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5 C	4,928,432
33 W	4,928,433
55	4,928,435
80 BS	4,928,436
165.71	4,928,437
283 R	4,928,438
284 E	4,928,439
293	4,929,256
309	4,929,257
426	4,928,440

CLASS 52

2 J	4,928,442
19	4,928,441
58	4,928,443
66	4,928,444
72	4,928,445
98	4,928,446
136	4,928,447
174	4,928,448
194	4,928,449
202	4,928,450
223 L	4,928,451
236.3	4,928,452
239	4,928,465
509	4,928,466
511	4,928,467
574	4,928,468
607	4,928,469
664	4,928,471
678	4,928,472

CLASS 53

53	4,928,473
67	4,928,453
409	4,928,454
425	4,928,474
433	B1 4,642,970
570	4,928,455

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12	4,928,456
86	4,929,258
158	4,929,259
213	4,929,261
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502	4,929,263
510	4,929,260

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11.8	4,928,458
12.7	4,928,457
13.3	4,928,459
14.6	4,928,460
339	4,928,461
341	4,928,462
656	4,928,470

CLASS 57

58.86	4,928,463
224	4,928,464
264	4,928,475
268	4,928,476
416	4,928,477

CLASS 60

39.05	4,928,478
39.092	4,928,480
39.161	4,928,482
39.36	4,928,479
226.1	4,928,483
240	4,928,484
299	4,928,485
338	4,928,486
414	4,928,487
480	4,928,488
602	4,928,489
670	4,928,490
734	4,928,491
737	4,928,481

CLASS 62

4	4,928,495
46.2	4,928,496
55.5	4,928,497
63	4,928,492
81	4,928,498
185	4,928,493
186	4,928,499
193	4,928,500
222	4,928,494
406	4,928,501
440	4,928,502
498	4,928,503

CLASS 63

9	4,928,504

CLASS 65

12	4,929,264
64	4,929,265
135	4,929,266

CLASS 68

253 R	4,928,505

CLASS 70

176	4,928,506

CLASS 71

77	4,929,267
88	4,929,268
92	4,929,269
	4,929,270
94	4,929,271
95	4,929,272
118	4,929,273

CLASS 72

38	4,928,507
42	4,928,508
61	4,928,509
131	4,928,510
361	4,928,511
404	4,928,512

CLASS 73

1 G	4,928,513
3	4,928,514
40	4,928,528
61 R	4,928,515
65	4,928,516
105	4,928,517
117.3	4,928,518
126	4,928,519
151	4,928,520
	4,928,521
155	4,928,522
167	4,928,523
200	4,928,524
290 V	4,928,525
313	4,928,526
657	4,928,527
726	4,928,529
756	4,928,530
838	4,928,533
855	4,928,531
856	4,928,532
861.18	4,928,534
862.02	4,928,535
862.41	4,928,538
863.83	4,928,536
863.86	4,928,537
864.11	4,928,540
864.24	4,928,539
864.63	4,928,541

CLASS 74

87	4,928,554
200	4,928,542
335	4,928,544
473 SW	4,928,545
479	4,928,546
545	4,928,547
573 F	4,928,548
594.6	4,928,549
595	4,928,550
606 R	4,928,551
745	4,928,555
867	4,928,557

CLASS 75

246	4,929,275

CLASS 81

57.3	4,928,558
63	4,928,559
463	4,928,560

CLASS 82

1.11	4,928,561

CLASS 83

278	4,928,562
552	4,929,276

CLASS 84

313	4,928,564
411 R	4,928,565
413	4,928,566
422.3	4,928,567
464 R	4,928,568
626	4,928,569
726	4,928,563

CLASS 89

6.5	4,928,570
7	4,928,571
8	4,928,572
14.4	4,928,573
34	4,928,574
36.02	4,928,575

CLASS 91

499	4,928,576

CLASS 92

177	4,928,577
187	4,928,578
248	4,928,579

CLASS 98

1.5	4,928,581
2	4,928,582
2.1	4,928,580
31.6	4,928,583

CLASS 99

289 T	4,928,584
450.8	4,928,592
485	4,928,591
576	4,928,590

CLASS 100

170	4,928,589

CLASS 101

9	4,928,588
42	4,928,587
129	4,928,585
134	4,929,109
230	4,928,586
389.1	4,928,593
405	4,928,594

CLASS 102

202.7	4,928,595
216	4,928,596
430	4,928,597
467	4,928,598

CLASS 104

12	4,928,599
17.1	4,928,600
53	4,928,601
111	4,928,602

CLASS 106

22	4,929,277
124	4,928,603
287.12	4,929,278
412	4,929,279
472	4,929,280

CLASS 110

103	4,928,604
261	4,928,605
347	4,928,606

CLASS 111

185	4,928,607

CLASS 112

121.12	4,928,608
	4,928,609
153	4,928,610
217	4,928,611
257	4,928,612

CLASS 114

26	4,928,613
66	4,928,614
203	4,928,615
267	4,928,616
	4,928,617
293	4,928,618
345	4,928,619
363	4,928,620

CLASS 116

234	4,928,621

CLASS 118

70	4,928,622
249	4,928,623
308	4,928,624
323	4,928,625
715	4,928,626
718	4,928,627

CLASS 119

1	4,928,628
	4,928,629
17	4,928,630
23	4,928,631
29.5	4,928,632
75	4,928,633
153	4,928,634

CLASS 122

7 R	4,928,635
13 R	Re.33,222

CLASS 123

41.31	4,928,637
52 M	4,928,638
52 MF	4,928,639
73 R	4,928,636
90.16	4,928,641
90.17	4,928,640
90.24	4,928,650
180 R	4,928,642
185 B	4,928,643
188 AA	4,928,645
188 P	4,928,644
196 AB	4,928,651
376	4,928,646
400	4,928,647
403	4,928,648
414	4,928,649
417	4,928,652
435	4,928,653
486	4,928,654
488	4,928,655
504	4,928,656
514	4,928,657
543	4,928,658
588	4,928,659
647	4,928,660

CLASS 124

69	4,928,661

CLASS 125

13.01	4,928,662

CLASS 126

21 A	4,928,663
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415	4,928,665
440	4,928,666
512	4,928,667
537	4,928,668

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	4,928,672
25 R	4,928,673
30.2	4,928,674
66	4,928,675
80 C	4,928,670
80 F	4,928,676
87 R	4,928,677
90	4,928,678
155	4,928,680
156	4,928,681
202.26	4,928,682
203.12	4,928,683
204.21	4,928,684
204.24	4,928,685
205.24	4,928,686
207.14	4,928,687
343	B1 4,323,071
419 P	4,928,689
419 PG	4,928,688
421	4,928,690
633	4,928,691
	4,928,692
637	4,928,693
	4,928,694
642	4,928,695
644	4,928,696
649	4,928,697
661.09	4,928,698
662.06	4,928,699
672	4,928,700
677	4,928,701
678	4,928,702
719	4,928,703
732	4,928,704
773	4,928,705
774	4,928,706
	4,928,707
	4,928,708
782	4,928,709
861	4,928,710
869	4,928,711
877	4,928,712

CLASS 131

84.1	4,928,713
359	4,928,714
365	4,928,715

CLASS 132

212	4,928,716

CLASS 134

64 R 4,928,717

CLASS 135

22 4,928,718

CLASS 136

201 4,929,281
239 4,929,282

CLASS 137

1 4,928,719
13 4,928,720
66 4,928,721
116.3 4,928,723
204 4,928,724
269.5 4,928,725
327 4,928,726
360 4,928,727
486 4,928,728
510 4,928,729
554 4,928,730
599 4,928,731
607 4,928,732
630.13 4,928,733
881 4,928,722

CLASS 138

154 4,928,734
4,928,735
178 4,928,736

CLASS 139

383 A 4,928,737

CLASS 140

93.4 4,928,738

CLASS 141

5 4,928,739

CLASS 148

11.5 A 4,929,285
13.2 4,929,283
23 4,929,284
111 4,929,286
276 4,929,287
326 4,929,288
402 4,929,289

CLASS 149

19.4 4,929,291
35 4,929,290

CLASS 152

243 4,928,740
504 4,928,741
534 4,928,742

CLASS 156

132 4,929,292
158 4,929,293
187 4,929,294
209 4,929,303
230 4,929,295
245 4,929,304
273.3 4,929,305
306.3 4,929,306
357 4,929,296
361 4,929,297
414 4,929,298
466 4,929,299
645 4,929,300
657 4,929,301
4,929,302

CLASS 159

47.3 4,929,307

CLASS 160

84.1 4,928,743
178.1 4,928,744

CLASS 162

145 4,929,308
164.3 4,929,309

CLASS 164

46 4,928,745
362 4,928,746
418 4,928,747
479 4,928,748

CLASS 165

1 4,928,749
2 4,928,750
11.1 4,928,751
104.17 4,928,752
104.27 4,928,753
134.1 4,928,754
168 4,928,755
182 4,928,756

CLASS 166

55.1 4,928,757
65.1 4,928,759
66 4,928,758
113 4,928,760
123 4,928,761
192 4,928,762
250 4,928,763
4,928,764
251 4,928,765
270 4,928,766
377 4,928,767
380 4,928,768
382 4,928,769
385 4,928,770
4,928,771
386 4,928,772

CLASS 169

37 4,928,773

CLASS 172

430 4,928,774

CLASS 174

16.2 4,929,801
35 MS 4,929,802
117 M 4,929,803

CLASS 175

19 4,928,775
45 4,928,776
329 4,928,777

CLASS 180

167 4,928,778
178 4,928,779
179 4,928,780
227 4,928,781
244 4,928,782

CLASS 181

106 4,928,783
4,928,784
120 4,928,785
137 4,928,786
141 4,928,787
4,928,788

CLASS 182

3 4,928,789
4,928,790
135 4,928,791
163 4,928,792
187 4,928,793

CLASS 184

5.1 4,928,794
7.4 4,928,795

CLASS 187

89 4,928,796

CLASS 188

156 4,928,797
218 XL 4,928,798
314 4,928,799

CLASS 190

115 4,928,800

CLASS 192

45.1 4,928,801
56 R 4,928,802
58 B 4,928,803
83 4,928,804
106.2 4,928,805

CLASS 198

345 4,928,806
379 4,928,807
397 4,928,808
408 4,928,809
699.1 4,928,810
774 4,928,811
847 4,928,812

CLASS 200

5 A 4,929,804
61.45 R 4,929,805
61.54 4,929,806
296 4,929,807
467 4,929,808

CLASS 202

158 4,929,310
4,929,311

CLASS 203

2 4,929,312

CLASS 204

18.1 4,929,315
56.1 4,929,316
59 R 4,929,317
153.1 4,929,313
153.23 4,929,314
157.6 4,929,318
164 4,929,319
192.2 4,929,320
192.38 4,929,321
4,929,322
206 4,929,323
4,929,324
4,929,326
268 4,929,325
272 4,929,327
279 4,929,328
299 R 4,929,329
402 4,929,330
426 4,929,331

CLASS 206

0.5 4,928,813
5.1 4,928,815
215 4,928,814
232 4,928,816
256 4,928,817
309 4,928,818
316.2 4,928,819
328 4,928,820
4,928,934
329 4,928,821
330 4,928,822
338 4,928,823
365 4,928,824
387 4,928,825
409 4,928,826
416 4,928,827
444 4,928,828
524.8 4,928,829
570 4,928,830
575 4,928,831

CLASS 208

65 4,929,332
4,929,333
91 4,929,334
106 4,929,335
120 4,929,336
4,929,337
4,929,338
131 4,929,339
189 4,929,340
390 4,929,341

CLASS 209

12 4,929,342
166 4,929,343
4,929,344
215 4,929,345
323 4,929,346

CLASS 210

58 4,928,942
101 4,929,347
109 4,929,348
151 4,929,349
157 4,929,350
195.2 4,929,351
232 4,929,352
237 4,929,353
248 4,929,356
321.61 4,929,354
640 4,929,357
4,929,358
663 4,929,359
679 4,929,360
698 4,929,361
701 4,929,362
741 4,929,363
750 4,929,364
754 4,929,365
784 4,929,355

CLASS 211

187 4,928,832
4,928,833
191 4,928,834

CLASS 215

11.5 4,928,836
31 4,928,835
250 4,928,837

CLASS 219

53 4,929,816
69.12 4,929,809
4,929,810
121.54 4,929,811
121.69 4,928,838
137.2 4,929,812
270 4,929,813
388 4,929,814
501 4,929,815
544 4,929,817

CLASS 220

5 R 4,928,839
8 4,928,840
21 4,928,841
85 R 4,928,842
90 4,928,843
207 4,928,844
271 4,928,845
354 4,928,846
408 4,928,847
444 4,928,848

CLASS 221

43 4,928,849

CLASS 222

3 4,928,850
103 4,928,851
107 4,928,852
108 4,928,853
129.1 4,928,854
131 4,928,855
174 4,928,856
211 4,928,857
312 4,928,858
402.14 4,928,859
466 4,928,860
481.5 4,928,861
604 4,928,862

CLASS 224

39 4,928,863
162 4,928,864
275 4,928,865

CLASS 225

106 4,928,866

CLASS 227

7 4,928,867
131 4,928,868

CLASS 228

20 4,928,869
107 4,928,870
179 4,928,871
203 4,928,872

CLASS 229

1.5 H 4,928,873
74 4,928,874
92.1 4,928,875
103.1 4,928,876
125.42 4,928,877

CLASS 235

381 4,929,818
383 4,929,819
487 4,929,820
493 4,929,821

CLASS 238

351 4,928,878

CLASS 239

8 4,928,879
4,928,880
44 4,928,881
112 4,928,882
223 4,928,883
290 4,928,884
717 4,928,885
533.5 4,928,886
533.8 4,928,888
584 4,928,887
751 4,928,889

CLASS 241

24 4,928,890
82.5 4,928,892
95 4,928,893

CLASS 242

7.09 4,928,894
35.5 A 4,928,895
43 R 4,928,896
55 4,928,897
55.1 4,928,898
59 4,928,899
71.1 4,928,900
85 4,928,901
107.2 4,928,902
130 4,928,903
158 R 4,928,904
201 4,928,905

CLASS 244

3.22 4,928,906
6 4,928,907
31 4,928,908
145 4,928,909

CLASS 246

169 A 4,928,910

CLASS 247

41 4,928,891

CLASS 248

74.1 4,928,911
221.2 4,928,912
224.1 4,928,913
274 4,928,914
288.5 4,928,915
354.1 4,928,916
507 4,928,917
688 4,928,918

CLASS 250

201.4 4,929,822
201.5 4,929,823
208.4 4,929,829
221 4,929,825
223 R 4,929,826
227.14 4,929,827
227.17 4,929,830
307 4,929,050
328 4,929,831
338.1 4,929,832
352 4,929,833
367 4,929,834
397 4,929,835
461.1 4,929,836
492.2 4,929,837
492.3 4,929,838
4,929,839
504 R 4,929,840
551 4,929,841
561 4,929,842
4,929,843
4,929,844
4,929,845
571 4,929,846
573 4,929,847

CLASS 251

89 4,928,919
100 4,929,377
118 4,928,920
175 4,928,921
180 4,928,922
221 4,928,923
315 4,928,924

CLASS 252

8.6 4,929,366
8.8 4,929,367
11 4,929,368
12 4,929,369
12.2 4,929,370
25 4,929,371
29 4,929,372
33 4,929,373
39 4,929,374
49.3 4,929,375
62.56 4,929,376
105 4,929,378
109 4,929,379
121 4,929,380
174.25 4,929,381
181 4,929,382
187.26 4,929,383
301.4 P 4,929,387
301.4 R 4,929,384
4,929,385
4,929,386
500 4,929,388
4,929,389
510 4,929,390
511 4,929,391
518 Re.33,223
582 4,929,392
609 4,929,393
633 4,929,394

CLASS 254

93 R 4,928,926
272 4,928,925
279 4,928,927

CLASS 256

13.1 4,928,928
24 4,928,929
67 4,928,930

CLASS 257

454 4,929,026

CLASS 261

65 4,929,397
94 4,929,398
112.2 4,929,399

CLASS 264

10 4,929,400
22 4,929,401
4,929,402
4,929,403
29.5 4,929,404
41 4,929,405
45.5 4,929,406
101 4,929,407
149 4,929,408
508 4,929,409
533 4,929,410

CLASS 266

45 4,928,931
58 4,928,932
237 4,928,933

CLASS 267

140.1 4,928,935

CLASS 269

73 4,928,936
136 4,928,937
261 4,928,938
309 4,928,939

CLASS 270

1.1 4,928,940
53 4,928,941

CLASS 271

4 4,928,942
6 4,928,944
9 4,928,945
10 4,928,946
24 4,928,947
110 4,928,948
111 4,928,949
112 4,928,950
113 4,928,951
150 4,928,952
185 4,928,953

CLASS 272

8 N 4,928,954
31 R 4,928,955
69 4,928,956
72 4,928,957
96 4,928,958
4,928,959
123 4,928,961

CLASS 273

1 GG 4,928,960
65 E G 4,928,962
73 D 4,928,963
78 4,928,965
4,928,972
143 R 4,928,964
148 R 4,928,970
164 4,928,971
176 A 4,928,973
186 R 4,928,974
192 4,928,975
195 A 4,928,966
240 4,928,976
254 4,928,967
357 4,928,968
422 4,928,969
428 4,928,977

CLASS 277

25 4,928,978
38 4,928,979
153 4,928,980

CLASS 279

1 SJ 4,928,981

CLASS 280

11.22 4,928,982
18 4,928,983
95.1 4,928,984
204 4,928,985
223 B 4,929,828
234 4,928,986
435 4,928,987
607 4,928,988
610 4,928,989
625 4,928,990
738 4,928,991
801 4,928,992
851 4,928,993
4,928,994

CLASS 281

29 4,928,995

CLASS 283

109 4,928,996

CLASS 285

13 4,928,997
49 4,928,998
113 4,928,999
133.1 4,929,000
158 4,929,001
319 4,929,002

CLASS 292

144 4,929,003
251.5 4,929,005
267 4,929,004
324 4,929,006
336.3 4,929,007

CLASS 293

108 4,929,008

CLASS 294

2 4,929,009
16 4,929,010
86.4 4,929,011
86.41 4,929,012

CLASS 296

91 4,929,013
97.8 4,929,014
116 4,929,015
118 4,929,020
136 4,929,016
153 4,929,017
204 4,929,018

223 4,929,019

CLASS 297

193 4,929,021
313 4,929,022
330 4,929,023
362 4,929,024
452 4,929,025
482 4,929,027

CLASS 298

19 R 4,929,028

CLASS 300

21 4,929,029

CLASS 301

37 N 4,929,030
37 P 4,929,031
38 R 4,929,032

CLASS 303

9.63 4,929,033
103 4,929,034
106 4,929,035
115 4,929,036
116 4,929,037
119 4,929,038

CLASS 307

246 4,929,848
269 4,929,849
272.1 4,929,850
359 4,929,851
475 4,929,852
4,929,853
480 4,929,854
571 4,929,855
633 4,929,856

CLASS 310

83 4,929,857
4,929,858
328 4,929,859
366 4,929,860

CLASS 312

18 4,929,861
138.1 4,929,862
213 4,929,039

CLASS 313

113 4,929,863
402 4,929,864
478 4,929,865
500 4,929,866
525 4,929,867
619 4,929,868
639 4,929,869

CLASS 315

169.3 4,929,870
205 4,929,871
209 R 4,929,872
219 4,929,873

CLASS 318

128 4,929,874
362 4,929,875
444 4,929,876
560 4,929,877
4,929,878
696 4,929,879

CLASS 320

30 4,929,880

CLASS 323

222 4,929,882
282 4,929,883
313 4,929,884

CLASS 324

66 4,929,887
78 R 4,929,890
154 PB 4,929,891
158 F 4,929,892
4,929,893
212 4,929,894
231 4,929,895
240 4,929,896
4,929,897
242 4,929,898
253 4,929,899
318 4,929,881
347 4,929,915
525 4,929,900
529 4,929,901
542 4,929,902
544 4,929,903
664 4,929,885
691 4,929,886
696 4,929,904

CLASS 325

66 4,929,674

CLASS 329

358 4,929,905

CLASS 330

149 4,929,906
252 4,929,907
254 4,929,908
256 4,929,909
257 4,929,910
264 4,929,911
288 4,929,912
308 4,929,913

CLASS 331

1 A 4,929,916
4,929,917
10 4,929,918

CLASS 335

38 4,929,919
202 4,929,920

CLASS 337

233 4,929,921
407 4,929,922

CLASS 338

308 4,929,923

CLASS 340

384 E 4,929,924
407 4,929,948
426 4,929,925
541 4,929,926
547 4,929,927
572 4,929,928
613 4,929,929
622 4,929,930
636 4,929,931
644 4,929,932
703 4,929,933
706 4,929,934
712 4,929,935
715 4,929,936
721 B1 Re.31,200
728 4,929,937
747 4,929,938
825.020 4,929,940
825.14 4,929,941
825.800 4,929,939
908.1 4,929,942
984 4,929,943

CLASS 341

24 4,929,944
50 4,929,945
87 4,929,946
146 4,929,947
176 4,929,949

CLASS 342

25 4,929,950
179 4,929,951
184 4,929,952
190 4,929,953
194 4,929,954
371 4,929,955
376 4,929,956
410 4,929,957
432 4,929,958

CLASS 343

700 MS 4,929,959
703 4,929,960
715 4,929,961
786 4,929,962

CLASS 346

1.1 4,929,963
4,929,964
75 4,929,966
107 R 4,929,965
110 R 4,929,967
140 R 4,929,968
4,929,969
160 4,929,970

CLASS 350

6.5 4,929,040
96.10 4,929,041
96.13 4,929,042
4,929,043
4,929,044
96.15 4,929,045
96.21 4,929,046
96.23 4,929,047
B1 4,802,732
96.24 4,929,048
96.29 4,929,049
96.30 4,929,051
96.32 4,929,052
96.34 4,929,053
252 4,929,054
276 R 4,929,055
321 4,929,056
333 4,929,057
4,929,058
334 4,929,059
338 4,929,061
339 F 4,929,060
345 4,929,062
353 4,929,063
355 4,929,064
413 4,929,065
415 4,929,066
421 4,929,067
422 4,929,068
423 4,929,069
432 4,929,070
463 4,929,071
582 4,929,072
609 4,929,073
625 4,929,074

CLASS 351

158 4,929,075
212 4,929,076

CLASS 354

75 4,929,971
4,929,972
293 4,929,973
299 4,929,974
317 4,929,975
322 4,929,976
420 4,929,977

CLASS 355

38 4,929,978
4,929,979
75 4,929,980
253 4,929,981
311 4,929,982
315 4,929,983

CLASS 356

4.5 4,929,077
320 4,929,078
336 4,929,079
338 4,929,080
354 4,929,081
358 4,929,082
400 4,929,083
446 4,929,084

CLASS 357

4 4,929,984
15 4,929,985
22 4,929,986
23.5 4,929,988
23.6 4,929,989
4,929,990
23.8 4,929,991
23.9 4,929,992
27 4,929,993
30 4,929,994
34 4,929,995
4,929,996
4,929,997
45 4,929,998
68 4,929,999
4,930,000
71 4,930,001
75 4,930,002
234 4,929,987

CLASS 358

19 4,930,003
29 4,930,004
36 4,930,005
44 4,930,006
75 4,930,007
4,930,008
76 4,930,009
78 4,930,010
84 4,930,011
102 B1 Re.31,239
105 4,930,012
133 4,930,013
209 4,930,014
246 4,930,015
296 4,930,016
4,930,017
298 4,930,018
335 4,930,019
400 4,930,020
451 4,930,021
4,930,022
460 4,930,023

CLASS 360

10.1 4,930,024
64 4,930,025
67 4,930,026
70 4,930,027
85 4,930,028
93 Re.33,224
97.01 4,930,029
107 4,930,030
4,930,031
132 4,930,032
137 4,930,033

CLASS 361

19 4,930,034
54 4,930,035
56 4,930,036
58 4,930,037
92 4,930,038
127 4,930,039
154 4,930,040
190 4,930,041
280 4,930,042
283 4,930,043
313 4,930,044
329 4,930,045
393 4,930,046
395 4,930,047
519 4,930,089

CLASS 362

26 4,930,048
32 4,930,049
61 4,930,050
4,930,051
104 4,930,052
121 4,930,053
149 4,930,054
244 4,930,055
272 4,930,057
364 4,930,056
400 4,930,058

CLASS 363

20 4,930,059
21 4,930,060
44 4,930,061
55 4,930,062
91 4,930,063
161 4,930,064

CLASS 364

200 4,930,065
4,930,066
4,930,067
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	4,929,476	4,928,836	4,929,555	4,928,516		4,928,421	4,928,459
	4,929,595	4,928,843	4,929,561	4,928,673		4,928,427	4,928,526
04 :	4,928,329	4,928,850	4,929,562	4,928,738		4,928,452	4,928,581
	4,928,417	4,928,851	4,929,602	4,928,760		4,928,461	4,928,591
	4,928,481	4,928,854	4,929,700	4,928,763		4,928,482	4,928,642
	4,928,587	4,928,863	4,929,740	4,928,819		4,928,490	4,928,868
	4,928,788	4,928,884	4,929,831	4,928,837		4,928,491	4,928,874
	4,928,867	4,928,891	4,929,839	4,928,986		4,928,495	4,928,875
	4,929,018	4,928,893	4,929,841	4,929,048		4,928,528	4,928,912
	4,929,191	4,928,907	4,929,861	4,929,180		4,928,676	4,928,914
	4,929,441	4,928,934	4,929,862	4,929,223		4,928,687	4,928,940
05 :	4,928,350	4,928,939	4,929,865	4,929,946		4,928,824	4,928,946
	4,928,620	4,928,954	4,929,867	4,930,115		4,928,857	4,928,952
06 :	Re.33,224	4,929,004	4,929,882	09 : 4,928,347		4,928,984	4,928,960
	4,928,337	4,929,008	4,929,890	4,928,379		4,929,062	4,928,962
	4,928,361	4,929,040	4,929,894	4,928,512		4,929,129	4,928,997
	4,928,410	4,929,041	4,929,895	4,928,675		4,929,141	4,929,022
	4,928,412	4,929,049	4,929,901	4,928,807		4,929,205	4,929,045
	4,928,425	4,929,065	4,929,913	4,928,813		4,929,247	4,929,132
	4,928,448	4,929,067	4,929,918	4,928,916		4,929,398	4,929,170
	4,928,479	4,929,071	4,929,950	4,928,944		4,929,445	4,929,196
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	4,928,493	4,929,090	4,929,952	4,928,978		4,929,566	4,929,228
	4,928,505	4,929,094	4,929,956	4,929,021		4,929,568	4,929,242
	4,928,522	4,929,099	4,929,958	4,929,054		4,929,800	4,929,261
	4,928,564	4,929,111	4,929,963	4,929,106		4,929,851	4,929,332
	4,928,574	4,929,112	4,929,991	4,929,130		4,929,910	4,929,333
	4,928,594	4,929,124	4,929,992	4,929,140		4,929,923	4,929,340
	4,928,595	4,929,125	4,930,001	4,929,231		4,929,948	4,929,364
	4,928,601	4,929,139	4,930,027	4,929,343		4,929,955	4,929,371
	4,928,614	4,929,155	4,930,037	4,929,354		4,930,011	4,929,382
	4,928,626	4,929,197	4,930,041	4,929,516		4,218,786	4,929,424
	4,928,638	4,929,206	4,930,047	4,929,517	13 :	4,928,391	4,929,425
	4,928,658	4,929,207	4,930,057	4,929,687		4,928,446	4,929,585
	4,928,662	4,929,208	4,930,065	4,929,751		4,928,968	4,929,648
	4,928,677	4,929,213	4,930,071	4,929,801		4,928,975	4,929,748
	4,928,686	4,929,233	4,930,074	4,929,807		4,929,172	4,929,761
	4,928,692	4,929,237	4,930,075	4,929,920		4,929,250	4,929,763
	4,928,694	4,929,259	4,930,097	4,929,924		4,929,452	4,929,781
	4,928,695	4,929,341	4,930,098	4,929,925		4,929,455	4,929,794
	4,928,696	4,929,359	4,930,099	4,930,042		4,929,480	4,929,796
	4,928,703	4,929,370	4,930,101	4,930,043		4,929,726	4,929,808
	4,928,704	4,929,383	4,930,102	4,930,125	15 :	4,928,969	4,929,864
	4,928,710	4,929,400	4,930,107	4,591,999		4,929,039	4,929,931
	4,928,711	4,929,402	4,930,130	10 : 4,928,344	16 :	4,928,394	4,929,933
	4,928,712	4,929,412	4,930,142	4,928,670		4,928,442	4,930,015
	4,928,721	4,929,426	4,930,150	4,929,587		4,930,018	4,930,045
	4,928,756	4,929,458	4,930,156	4,929,594	17 :	Re.33,225	4,930,126
	4,928,773	4,929,500	1,031,200	4,929,704		4,928,363	18 : 4,928,332
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DESIGN PATENTS

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	308,141	08 :	308,276	20 :	308,209	33 :	308,274		308,144		308,278
	308,145	09 :	308,250	22 :	308,195	34 :	308,165		308,190	44 :	308,173
	308,158		308,257	23 :	308,207		308,175		308,275	45 :	308,170
	308,171		308,260	24 :	308,240		308,178	39 :	308,166	48 :	308,131
	308,194		308,261	25 :	308,198		308,217		308,233		308,230
	308,196	12 :	308,179		308,220		308,235		308,234		308,237
	308,205		308,232		308,269		308,249		308,267		308,259
	308,211		308,264	26 :	308,185		308,268		308,273		308,279
	308,223	13 :	308,238		308,187	36 :	308,127	40 :	308,129	50 :	308,246
	308,225	16 :	308,253		308,213		308,146		308,182	51 :	308,169
	308,227	17 :	308,126		308,218		308,150	41 :	308,125		308,192
	308,229		308,142	27 :	308,153		308,152		308,266	53 :	308,242
	308,231		308,163		308,193		308,157	42 :	308,132	55 :	308,140
	308,244		308,186	28 :	308,224		308,176		308,133		308,206
	308,262		308,252	29 :	308,149		308,243		308,134		308,212
	308,270	18 :	308,148		308,151		308,245		308,135		308,265
	308,271	19 :	308,216		308,167		308,248		308,177		

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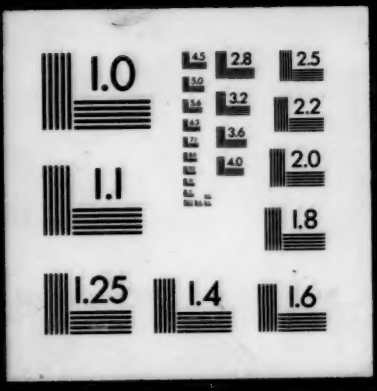
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